

CORRELATING CONVERGENCE IN PRODUCT DESIGN

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David C. Bingham

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CORRELATING CONVERGENCE IN PRODUCT DESIGN

Approved by:

Wayne Chung, Advisor
College of Architecture
Georgia Institute of Technology

Abir Mullick
College of Architecture
Georgia Institute of Technology

Chandan Gokhale
College of Architecture
Georgia Institute of Technology

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TABLE OF CONTENTS

Acknowledgements	iii
List of Figures	vi
Summary	viii
Chapter	
I Introduction	1
Three Facets of Convergence	2
Content	3
Distribution	3
Platform	4
Device-Centric Convergence	4
Activity-Centric Convergence	7
II Methodology	11
Survey Influence	11
Survey Construction	12
Scoring and General Results	15
Input/Output Mapping	17
III Findings	19
Own versus “Would Purchase”	19
The Price of Flexibility	23
Similar Inputs Portray Similar Function	27
Attractiveness Bias	31

TABLE OF CONTENTS

Chapter		
III	Findings (continued)	
	Joyful Products	33
	Enjoy a Cup of Coffee	33
	What's on TV?	36
	Take It With You	39
IV	Conclusion	44
	Appendix A: Survey	48
	Appendix B: Raw survey data	59
	Appendix C: All created graphs	73
	Appendix D: Input/out maps	99
	References	105

LIST OF FIGURES

Figure 1: Three Facets of Convergence	3
Figure 2: Home Motor Advertisement	2
Figure 3: Potbelly and Jetboil stoves	8
Figure 4: “Specialist” televisions	11
Figure 5: “Generalist” televisions	12
Figure 6: Product pairs	13
Figure 7: Input/output mapping legend	17
Figure 8: Own versus “Would Purchase” graph	20
Figure 9: Own versus “Would Purchase” table	21
Figure 10: Printer graph	22
Figure 11: Printer input/output map	23
Figure 12: “Useful” graph	24
Figure 13: “Intuitive” graph	24
Figure 14: “Easy to use” graph	25
Figure 15: “Convenient” graph	25
Figure 16: “Useful” and “Intuitive” difference table	26
Figure 17: Input parity versus Function parity graph	28
Figure 18: Input parity versus Function parity tables	29
Figure 19: All Products graph	31
Figure 20: “Attractive” graph	32
Figure 21: “Enjoy” graph	33
Figure 22: Coffee Maker graph	34
Figure 23: “Perceived Quality” graph	34

LIST OF FIGURES

Figure 24: Coffee Maker input/output map	35
Figure 25: Philips Senseo coffee maker	36
Figure 26: TV graph	37
Figure 27: “Value” graph	37
Figure 28: TV input/output map	28
Figure 29: Personal graph	29
Figure 30: Knife graph	30
Figure 31: Phone graph	31
Figure 32: Watch graph	32
Figure 33: Personal fashion devices	43
Figure 34: Convergence overview	44
Figure 35: Convergence quadrants	46

SUMMARY

Convergence is a topic that many point to as the driving force behind modern product development. The merger of similar devices into a single product form can create a number of advantages for both producers and consumers, but successful design must take more than just this into account. Convergence is the evolution of a product through a disruptive and uncertain environment of technology and user needs. While the digital revolution has certainly been the biggest recent disrupter to society and design, there are signs of convergence in both form and function that have occurred across many products, and product categories. Producers and consumers always clamor for devices that are useful and convenient, take advantage of the latest technologies, and yet remain intuitive, attractive, and easy to use. This paper will dissect the meaning of convergence in product design and provide a framework for understanding and dialog. Combined with an extensive survey and product mapping, this definition will then be used to delineate approaches and principles for the effective design of evolving products in today's changing environment. The findings of this paper will help designers make decisions when considering the trade-offs between aesthetics, functionality, and ease of use in technology based products.

CHAPTER 1

INTRODUCTION

As a company develops a product, there are a number of decisions made regarding the functions and forms a product will acquire. Designers must decide whether the function of a product should be refined or extended, if a new technology is worth incorporating, or how much user disconnect will be created by defining an entirely new look. There are a number of trade-offs made with engineering, business, and manufacturing, but the end result must be of greater benefit to the end-user than the product it is replacing. Ideally, designers create new products harmoniously matched to user-needs and update older products with beneficial features and technologies. To be worthwhile, the evolution must create a positive change. Producers and consumers alike have found positive changes in converging similar designs, but approaching convergence during the design phase is a difficult proposition.

The term convergence has become such a marketing and technology buzzword that its meaning in product development has become greatly diluted. With over 120,000,000 Google results, “convergence” returns close to five times as many results as “divergence.” The unofficial theme of the International Consumer Electronics Show for the past decade has been ‘convergence’, but what exactly is getting converged and why is it taking so long to achieve? There are a number of instances where convergence has been used to describe a product without much explanation as to the meaning. In a 2005 interview, InterActiveCorp CEO Barry Diller discussed Web 2.0 and his company’s acquisition of Ask Jeeves saying, “The search box is evolving and there will be more and more convergence through it.” [Battelle] British Telecommunications’ Futurist, Ian Pearson has said that 2006 will, “see the convergence of a whole stack of IT trends.” [Glasner] And during an interview at the 2005 CES, Bill Gates stated, “For us, the key convergence product is the Media Center PC, which is the idea of that single remote control giving you the best TV experience, music and photos but also the full power of the PC.” [Kanellos]

All of those quoted are referencing the digital technology industry, which has been an ex-

tremely disruptive force to society and design. Such disruption creates a great deal of uncertainty and experimentation with few or no optimal strategies around which designs can converge. [Lidwell] If you consider the evolution of music listening from the phonograph, to records, to cassettes, to CD, and now to digital media, each phase initially created numerous product form languages and control interfaces that eventually settled into a stable, more familiar format. Opportunities for product designers during these phases drastically increase, though succeeding depends upon finding those optimal strategies. When considering aspects of a product to focus or extend, what strategies and principles can designers take advantage of to develop products that most meet user needs during periods of convergence? This paper will review product areas beyond digital technology to find how convergence has been most influential. These discoveries will be related to known design principles and create some new guidance for designers to follow in developing convergent products.

Three Facets of Convergence

Because convergence can happen to devices as well as search boxes, and IT trends, a framework will be established for the use of the term ‘convergence’ in this paper, and the nuances of its use will be clarified. At the highest level, there are three aspects in which convergence can act upon a product or system: content, distribution, and platform [Forman]. All three of these facets are very tightly intertwined though some of the biggest companies in the world have gained their strength by focusing on one single area. BP has extended “beyond petroleum” to converge all energy types including solar, wind, and hydrogen fuel into its content offerings. Cisco Systems continuously develops new communications technologies and works with other companies to define the standards for distribution of digital media. From the time of Henry Ford, the entire automobile industry is one in which convergence has created a standardized platform and consistent set of interface controls.

Convergence within any of these three areas can reach a scale requiring government intervention, standards groups, and huge amounts of time and money to implement. These high-level decisions may seem to lofty too influence everyday people, but eventually the result can have a very direct effect on consumers and smaller companies. When a technology evolves

and stabilizes, companies must shift their focus from the technology itself to the activities their customers relate to their product. Nikon initially engineered microscope and binocular optics for 30 years before introducing their first consumer camera. Today, Nikon's cameras comprise more of their total sales revenue than all other divisions combined. [Nikon]

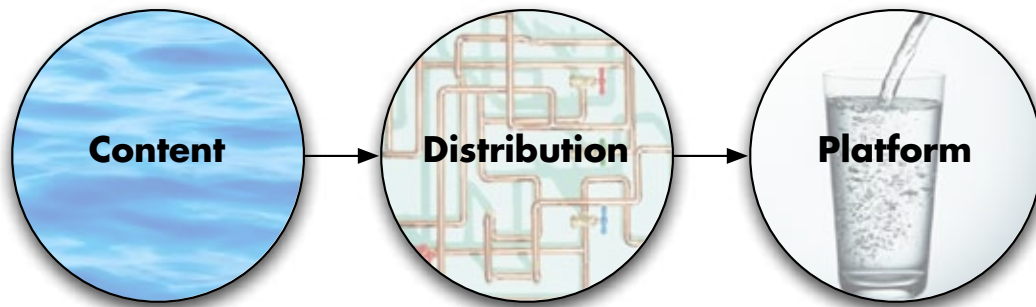


Figure 1: Three Facets of Convergence

Content

Content is the shapeless media that people consume. It is the metaphorical water and electricity that flow into homes and drives the use and need for other products and services. Video, audio, text, images, and raw data are all basic forms of content that convergence in the digital-age has been greatly affecting. Johan Lindén, with the national television broadcaster in Sweden has said that “With the merge of print, audio and visuals, content providers can extract the very best of every media and use the tools to tailor the message.” [Gupta] By having a converged set of media types, content creators and consumers have a common format to communicate. With at-home movie viewing, the variety of possible video and audio formats have been standardized so all movie studios can produce a single type of file that all consumers can enjoy. Digital music is currently moving through an unstable period with MP3, WMA, AAC, and numerous other audio formats competing for consumer attention.

Distribution

Without distribution, the content would never reach the consumer. Distribution is the

pipes, wires, and related infrastructure that transmit a provider's media from point A to point B. From a technical standpoint, content and distribution are very intertwined. The engineering and manufacturing limitations of creating the content and building the infrastructure to transmit it run very parallel and quite often leap-frog each other to push innovation. DVDs are one of the best examples of a product that combines content and distribution convergence in a way that has been tremendously successful for both content providers and consumers. The standardized video and audio content is put onto a common plastic disc able to be manufactured, transported, and sold universally.

Platform

The device in which content is delivered to and consumed is the platform. A drinking glass would be the platform for water sent through the plumbing. Out of the three facets of convergence, the platform is the primary user interaction point, therefore, this is the realm of the product designer and will be where this paper focuses its attention. While the lines can become blurred within these facets of convergence, the platforms "are where technological choices are most wide open. The number of competing standards and architectures is enormous. How the competition plays out will largely determine how complete, and how soon, convergence will emerge." [Forman] Within product convergence, I have defined two distinct variations to span the evolution of rigid technological capabilities to the more abstract human task domains.

Device-Centric Convergence

Device-centric convergence occurs when a new technology transitions into a consumer device and the product's form remains highly indicative of its supporting technology. The device-centric product attracts a number of potential uses since the technology that created it is still novel in the eyes of the consumer. As the technology matures, products designed with device-centric convergence become more hybrid products that emphasize convenience, portability, or low cost.

Many new technologies that reach popularity through a consumer product were initially

developed in isolation or never intended for what became their most common use. Researchers and scientists spend vast amounts of time and money to engineer solutions to focused problems or create greater efficiency within existing solutions. In both engineering and manufacturing, the increase in solutions and efficiencies create a vast range of components and capabilities for designers to realize through consumer products. The most influential of these technologies revolutionize industries and eventually affect everyday life in an equally disruptive manner.

An often-cited example of such development is the electric motor. Initially used to replace the steam-engine in factory applications, the first electric motors were large devices placed in a central location with belts and pulleys used to transfer their power to a multitude of individual machines. As advances in engineering and manufacturing continued, several smaller and less-expensive motors began replacing the single, large motor. Each machine that was once powered by a remote multi-use source now had its own local focus-use power plant. As with many industrial technologies, the use of the electric motor trickled to a consumer level. This 1918 Sears Roebuck catalog shows the electric motor having made its way to the consumer as a “Home Motor.” The description reads:

Home Motor- This motor, as shown above, will operate a sewing machine. Easily attached; makes sewing a pleasure. The many attachments shown on this page may be operated by this motor and help to lighten the burden of the home. Operates on usual city current of 105 to 115 volts. Shipping weight, about five pounds. Price, complete as shown - \$8.75.

Still very much a technology product, the Home Motor was more about the motor and less about addressing user needs. Many attachments with varying functions took advantage of the engineering capability and converged around the device. Fans, buffers, mixers, churns and beater attachments allowed people to use a single device for a wide range of generally unrelated activities. Having to continuously reconfigure the same tool to make a milk shake, cool a room, and shine your shoes is the trade-off for access to such expensive and luxurious technology. Not many people could afford what in today’s dollars would cost around \$110,

or discovering new implementations for the technology. A company that has manufactured electric motors for decades will eventually perfect the engineering and manufacturing of a motor to the point that additional technology development will only strive to serve niche markets. At this point, the more critical issue for the company has moved away from the device and toward the implementation, or activity.

Such advances within engineering and manufacturing range from batteries, to communications, new materials, and most recently, computerization. The pace of development enables the product designer to be less and less bound by the limitations of component size, cost, capacity, power consumption, and connectivity. The designer is able to experiment with form-giving, controls, and user-experience in determining the characteristics of an ideal consumer product. The number of product possibilities is vast when technology has such undefined consumer applications. Experimental designs are evaluated and revised against production abilities and, if need be, new technologies are developed in order to fulfill a discovered user-demand. While this allows the designer a much greater range of soundly-engineered design solutions, it creates an increased responsibility to determine the form and controls best suited to the user's needs. The technology used to create a product is a prerequisite to its functioning, but it is rarely a model of behavior and use.

This brings convergence in product development to a transition point. Many times, a common set of hardware elements, such as the Home Motor, are used for a wide range of disparate activities. While there may be a cognitive disconnect between the various activities, the use of shared components saves quite a bit on cost and physical space. This is the branch of convergence that I will refer to as device-centric: when an unsettled product environment is addressed through combining devices and minimizing components without regard for the relation of the individual device's primary function.

Activity-Centric Convergence

The second type of convergence is activity-centric. Activity-centric convergence is opposed to device-centric convergence in that the goal is creating product development strategies through merging related human tasks that best accomplish a single goal. If devices and

components are reduced in the process, all the better, but doing so is more circumstantial or secondary in importance. A product developed with an activity-centric intent optimizes the various tasks associated with an activity by using or developing necessary technologies. If the technology is not available or able to be developed, an activity-centric approach will not bring a product to fruition. Discovering related tasks to be merged into a single product could point the way for an ideal technology, but for this reason, device-centric convergence will typically occur earlier in the evolution of a product.

An example distinguishing the evolution of a product from device-centric to activity-centric is seen in cooking. The potbelly stoves of the 1900's, figure 3, provided a home with heat, hot water, a stove top, and a quicker way to dry wet clothes. Like the Home Motor, a household might only have a single potbelly stove to satisfy these numerous needs. The technology of controlled heat drew numerous disparate activities to a single device. As the technology progressed over 100 years, we can see how a similar single device, the Jetboil camping stove, now satisfies a very focused need. The Jetboil stove is about the size of a thermos and performs the sole function of cooking through converging all related tasks into a single product. It won't dry your clothes, or heat your home, and its efficiency is so high that the expelled



Figure 3: Potbelly and Jetboil stoves

heat hardly warms anything but the intended container. This is a highly activity-centric product.

This end of product convergence melds well with the scientific research field of Activity Theory. “In Activity Theory, the perspective of the individual is at the center of everything. AT focuses on the cognitive process of an individual situated in a social, cultural, historical, and artifactual world.” [Halverson] A clear relationship hierarchy is created in which activities are composed of tasks and tasks are then composed of actions. An activity is a goal-directed set of lower-level activities or, tasks. An example of such a relationship following the cooking products is found in the activity of “making soup.” Tasks within this activity could be “set up stove,” “light stove,” and “eat soup.” Actions are a still lower-level interest and refer to such things as “measure soup,” “adjust heat,” and “pour soup.” Operations are a further distinction of actions that includes the physical motions required to perform an action, such as “screw on canister,” “press ignition,” and “snap off lid.”

This approach to product development is championed by Donald Norman who says:

“I’m not in favor of single-purpose devices. I’m in favor of single-activity devices, things that bring together into one container, one unit, activities or tasks that naturally go together. What I recommend is that we observe what activities people do and what people’s needs are, and try to discover the interactions among them. Then we design and build devices where there are heavy interactions, and we use separate devices where there are very few interactions.” [Norman]

Scoping the top-level activity for an activity-centric product can be quite daunting for a product designer. Extensive research and testing is required to ensure the product is addressing the tasks and actions within the activity’s domain without incorporating too much functionality or leaving out critical parts. This is easily attained using abstraction, but for a designer to give form to the product, a connection with engineering and manufacturing must be established. With new technologies being introduced at a rapid pace, the lure of device-centric convergence can muddle the issue with conveniences and functionality that were heretofore unavailable. A delicate balance must be considered by the designer depending on

where the product is on its evolutionary scale. Focus-use devices are inherently activity-centric and simply entail matching a basic activity with the necessary technologies to support it. Without a guiding framework, multi-use devices cause an activity's domain and components to become so convoluted that any convergence beneficial to the user is a difficult issue.

The relationship between activity-centric and device-centric convergence within design is large and multi-faceted. Consumers respond to and benefit from products that represent both ends of the spectrum. Some products may very naturally create convergent strategies by merging their forms while traits from dissimilar products could point the way for designers looking to enhance a specific product need. To discover some of the possible trends within product convergence and how a product falls within a device-centric to activity-centric range, a detailed survey was issued.

CHAPTER 2

METHODOLOGY

Survey Influence

This survey is influenced by an article titled *Influence of Machines and Mindlessness* in The Society for the Psychological Study of Social Issues that examined people's social responses to computers. One part of the study required participants to watch television news and comedy shows on separate television sets and evaluate the content. While all three televisions were physically identical, two were considered "specialist" sets and were labeled with signs reading "News Television" and "Entertainment Television". The third television was considered a "generalist" television and was labeled "News and Entertainment Television". Half of the participants were told they would watch a mixture of programming on an ordinary TV that is used to watch both news and entertainment. The other half were told they would watch news on a television used only to watch news programming and would watch comedy on a different television used only to watch comedy programming. Despite the fact that the exact same content was being shown across all televisions, participants in the "specialist" condition thought the news segments were significantly higher in quality, more informative, interesting, and serious than did participants in the "generalist" category. Similarly, those participants watching the "specialist" entertainment television thought the programming was significantly funnier than participants in the "generalist" category. [Nass]



Figure 4: "Specialist" televisions



Figure 5: “Generalist” televisions

The varying qualitative traits between two fundamentally similar products found in the *Influence of Machines and Mindlessness* was surprising and inspiring. Could there be a similar relation between products of varying convergence? How would people relate a common set of product traits to an activity-centric device and a multi-use complex device? The *Influence of Machines and Mindlessness* research used the same products and the same content while changing the perception through a simple label. This survey extends a similar approach toward people’s views of product attributes in order to determine trends and differences among products. For designers, the larger questions addressed in this survey are:

- *Within traits are considered important and unimportant?*
- *Which traits relate to a focus-use product or a multi-use product?*
- *What correlates a multi-use product to activity or device-centric convergence?*

Answers to these questions can help designers better match an evolving technology with user expectations. The importance of certain traits and their relation to specific product types can keep designers focused and not designing all things to all people.

Survey Construction

A printed survey was created and handed to volunteer respondents to manually fill out. (see appendix A) They were instructed that the purpose of the study was “to discover typical adult consumers’ responses to a number of everyday product images” and the process would



Figure 6: Product pairs

take less than 30 minutes to complete. Images of the products chosen are seen in figure 6 and represent a sample of common household items. Each pair was chosen from the same manufacturer to limit any brand loyalty issues and were presented in the following mixed-order: toaster, hammer, TV, printer, phone, radio, screwdriver, watch, coffee maker, and knife. The specific devices were chosen as popular and identifiable products in today's culture and not for their direct association with activity-centric or device-centric convergence. It is understood that focus-use versions of all products are activity-centric and will be used as a baseline of comparison within the product pairs. It is the multi-use versions of products that presumably lean toward activity-centric or device-centric convergence. Analysis of the survey results will create some of these associations in relation to other discovered topics and trends.

The survey itself consisted of four major inquiries per product pair. The first question was to “Name the primary function of this item.” Each subject would review the images of each product and enter what they believe is the product’s primary function. Example responses for the toaster products included, “toasting,” “baking,” “reheating,” “cooking,” etc.

The second question was a simple yes or no answer to “Have you ever owned this item or one very similar?” Subjects would consider each product and respond if they own either. To prevent relating to the exact product pictured, subjects could still reply “yes” if a closely related product was owned.

The third section is the longest and most important. To determine how people associate traits among product pairs, a five point Likert-scale was used with a product on either end. Subjects review each term and then mark one of the five degrees toward the product they feel that term most applies. This gives the subject two degrees toward one product, two degrees toward the other product, and a middle neutral choice. To prevent a continued relation of the left or right side of the scale with focus-use or multi-use products, the pairs were randomly switched to either side.

The words chosen for evaluation range from the emotional to the functional. An intentional disclosure of terms has been created to move the subject from first-impressions to emotional to function and ending with basic purchasing decisions. The initial terms presented to the subject are more surface-evaluation and related to the subject’s initial impression of the product pair. Traits presented in the middle of the list are slightly more emotional, such as “value” and “enjoy”. The end of the list requires the subject to increase their evaluation of actually using and owning the product.

Within the design community, most of these terms have a well-known association with design traits. The New Oxford American Dictionary definition for each is listed below:

Attractive: *Pleasing or appealing to the senses.*

Perceived Quality: *The standard of something as measured against other things of a similar kind; the degree of excellence of something.*

Value: *The regard that something is held to deserve; the importance or preciousness of something.*

Enjoy: *Take delight or pleasure in.*

Intuitive: *Using or based on what one feels to be true even without conscious reasoning; instinctive.*

Convenient: *Fitting in well with a person's needs, activities, and plans.*

Useful: *Able to be used for a practical purpose or in several ways.*

Easy to use: *Absence of difficulty or effort.*

Would purchase: *Acquire (something) by paying for it; buy.*

The final part of the survey was to review the list of terms and to “Please circle which single term is most important to you for this image-pair.” This part of the survey makes each subject determine which of the available terms is of greatest significance. While the individual terms may relate within the Likert-scale to one product or the other, this question looks at the products as a set. Circling “enjoy” for the toaster would not indicate a preference for the focus or multi-use product version, but that “enjoy” is the most important trait for that particular product category.

Scoring and General Results

The total number of survey respondents was 56, though 9 were eliminated due to incomplete or skipped answers. The final pool of 47 was a mix in both profession, geographical location, sex and age. Professions included health care, students, sales, marketing, design, engineering, account management, and programming. Most respondents were in Atlanta, Georgia, though a significant number were also from the Louisville, Kentucky and Chicago, Illinois areas. The male to female split was 47 percent male, 53 percent female. The mean age was 29 with a standard deviation of nine.

The Likert-scale traits were scored with 0 as the neutral position, +1, +2 toward the focus-use

product and -1, -2 toward the multi-use product. This allows 0 to act as a balance point and the further positive or negative the number, the more toward a focus-use or multi-use product that trait leans. The “negative” and “positive” choice does not represent any relation to “worse” or “better” within the scoring. In the graphs that follow, all scales have been converted to a base-10 scale for ease of comparing and understanding. For example, the toaster received an average score of +4.6 for the trait “attractive”. Based on the possible range of -10 (fully multi-use) to +10 (fully focus-use), that would mean attractiveness is significantly associated with the focus-use product version. These ranges were tallied and averaged across all products and respondents, and then visualized along the x-axis of a series of graphs.

The produced graphs display data within the product and trait contexts. The product graphs show all of the traits scattered across a single product, such as the printer, or group of products such as “kitchen” (toaster and coffee maker) or “tools” (hammer and screwdriver). This context allows the comparison of all traits in relation to a single focus-use and multi-use product category. The trait graphs display the reverse context with products scattered across a single trait. The advantage of this graph is comparing products to one another under the same category. A trait graph for “attractive” can visually relate the importance of that single trait among products such as the toaster with a +4.6 and to the printer with a +1.8 along a single axis.

The y-axis displays, as a percentage, the number of times an individual trait was circled as being most important to that product pair. For product graphs, this number is always based on the total of 47 respondents since each respondent was required to circle a trait for each product. Using the toaster as an example, “attractive” was circled only once across all 47 surveys, equating to 2.1%. This rating for trait graphs is calculated in the same way but is not based on a consistent 47 since each respondent was not required to circle a product for each trait. Across all surveys and all products, “attractive” was only circled as most important 23 times. This makes the one time “attractive” was circled for the toaster equate to 4.3% of the 23 “attractive” trait responses.

A tremendous amount of data was acquired that can be parsed in a number of ways. Sub-

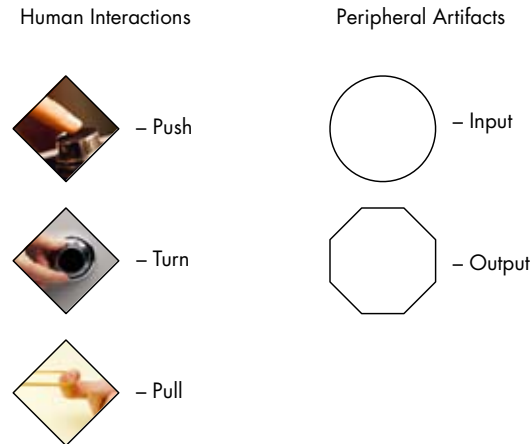


Figure 7: Input/output mapping legend

categories of sex, age, and professional groups could yield more detailed data, but the lowest level of division this study will discuss is the individual products and traits throughout the respondent population as a whole. As mentioned, some products will be combined into groups such as “Kitchen” (toaster and coffee maker) or “Tools” (hammer and screwdriver) for an analysis of convergence within these larger product categories. For statistical rigor, a Friedman test was performed across responses with no significant result. Regardless, the data will be reviewed at a high level for possible trends and associations with known design principles that product designers can use when determining the viability of product convergence.

Input/Output Mapping

The input/output mapping follows the process of using some of the product pairs discussed in the survey. For each product to fulfill its purpose, a certain amount of human interaction and peripheral artifacts are required. These are considered the inputs of the product and are displayed at the top of the map with arrows leading into one or both products. Peripheral artifact images are within circle frames and human interactions are inside diamond frames, as seen in figure 7. I have chosen three primary types of human interactions for all of the mappings. Push-buttons and switches are designated by a finger pushing a button, pull-levers and handles are designated by a pulling finger, and knobs are designated by a hand turning a dial. To limit the amount of map clutter, a number has been placed over each human inter-

action graphic to denote the quantity of that interaction point within the product.

Below the product pairs are images within octagon frames representing the output result. Not all outputs necessarily require all inputs and some of the outputs may be combined to form more complex outputs. As this could lead to an endless array of complexity, the outputs of any product are limited to a single degree of separation and association with the function(s) of the product.

The mapping gives a visual relation of the inputs and outputs of each product within a product category. In evaluating the function of each product, the similarity or difference in the amount of human interaction points is another method of comparing focus-use and multi-use products. As the multi-use product adds functionality it may require an increased amount of human input and peripheral artifacts to provide an increased output. The input/output mapping will help understand if the product category has settled on an optimal set of controls and if each product's output is related to a similar activity.

CHAPTER 3

FINDINGS

Own versus “Would Purchase”

To examine initial trends with convergent products, we will look at what people have been purchasing. As mentioned in the introduction, convergence isn't necessarily a new concept to companies or consumers, and most of the products used in the survey are fairly common. One of the initial survey questions for each product pair was, “Have you ever owned this item or one very similar?” This question requires a basic yes or no response which was logged and totaled to give an overall percentage of ownership for each product in each product category. The graph in figure 8, shows the percentage of stated ownership along the y-axis. The length extending above the x-axis represents the percentage owning a focus-use product while the length extending below the x-axis represents the percentage owning a multi-use product. The longer the overall product line, the greater percentage of people who own both the focus and multi-use products, such as the hammer, toaster, and screwdriver. The greater the disparity between the above x-axis and below x-axis lines, the more a focus or multi-use product is owned. As seen in the graph, the line lengths above the x-axis are much longer than those below the x-axis. This denotes a higher percentage of those owning, past or present, focus-use versions of every product pair. The average difference is 38% between focus and multi-use ownership which is a significantly greater percentage of focus-use products owned.

The x-axis measures “would purchase” in the same scale as the other trait graphs. Products very close to the y-axis are relatively negligible in people's propensity to purchase a focus or multi-use product version. Those responses located to the right end of the x-axis are more likely to purchase a focus-use version while those at the left end are more likely to purchase a multi-use version. Arranging this graph into quadrants, the upper right section reflects those that own and “would purchase” a focus-use product. The lower left section reflects those that own and “would purchase” a multi-use product. The other two sections show those that own a focus or multi-use product but “would purchase” the opposite, and vice-versa.

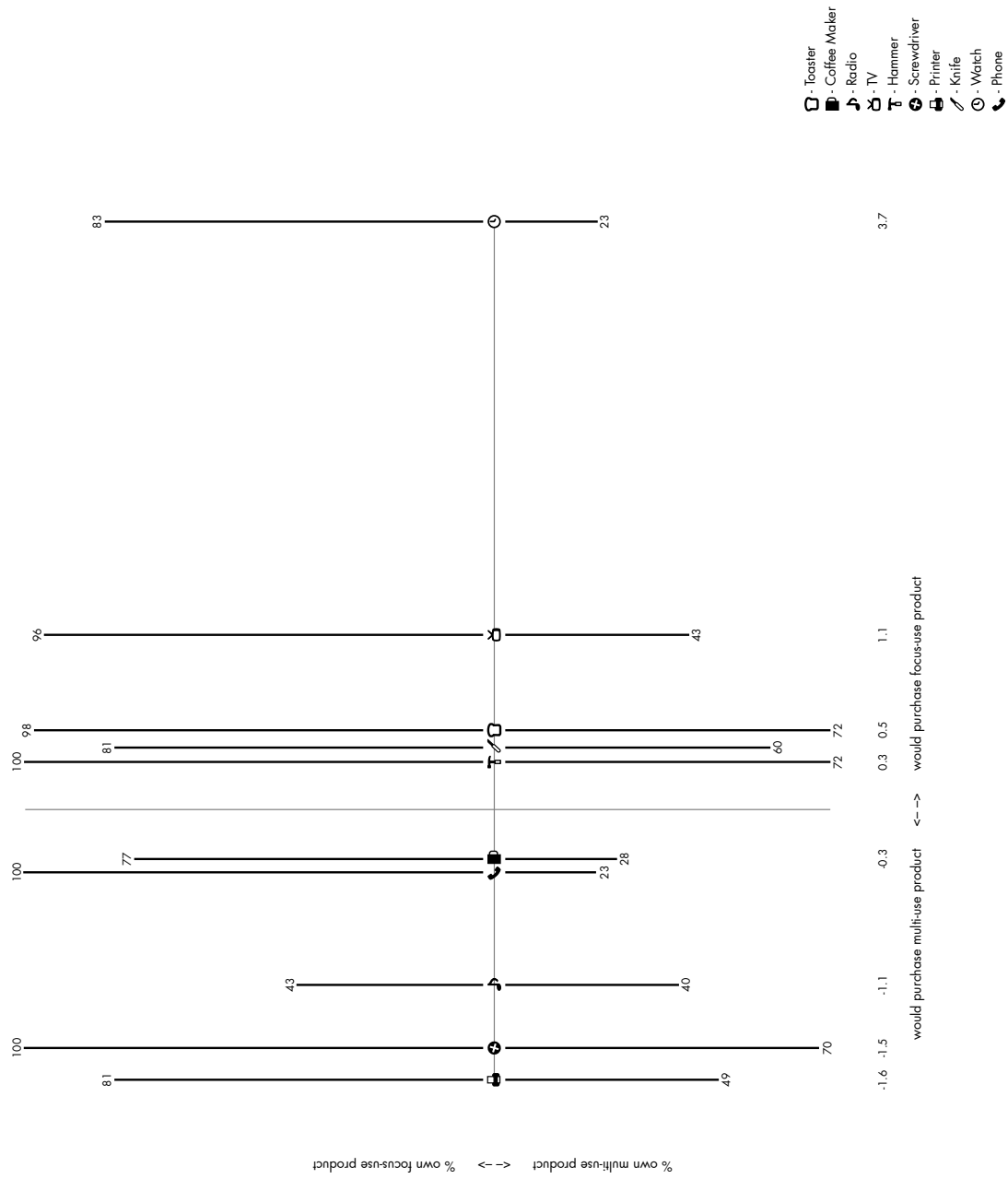


Figure 8: Own versus "Would Purchase" graph

Own focus-use item	Own multi-use item	% of respondents	"Would Purchase"
yes	yes	45%	-0.5
yes	no	41%	+1.3
no	yes	4%	-3.9
no	no	10%	-0.3
86% yes	48% yes	100%	+0.1

Figure 9: Own versus “Would Purchase” table

The table in figure 9 gives a further breakdown of respondents owning focus and multi-use items and their purchasing tendencies. The bottom row shows that overall preference for purchasing a focus versus multi-use device is negligible, but ownership of focus-use devices is almost twice that of multi-use devices. It might be expected that the high ownership of focus-use devices would sway purchasing more toward focus-use devices, but overall, that is not the case.

Examining the breakdown, those that own a focus-use item represent the vast majority, but those that own both a focus and multi-use item are not as prone to purchase a focus-use item. Again, the scale ranges from -10 to +10 with positive preferring focus-use and negative preferring multi-use. Those owning solely multi-use products accounted for the lowest percentage of respondents, but this group demonstrated the most sway toward purchasing a multi-use item. If multi-use products— regardless of device or activity-centric convergence—are considered a progression in design, this group could be referred to as “early adopters” with small numbers but on the forefront of product use and consumption. [Rogers] The laggards who don’t own either item represent a substantial percentage of respondents and have an almost negligible preference for multi-use products.

What is most remarkable with this breakdown is the influence of owning, or not owning, a multi-use product. While the numbers are not overwhelming the patterns that start to emerge pose the question, what else is drawing people to make purchasing decisions in relation to convergent products? The figure 8 graph consists of two quadrants of people who own what they would purchase, while the other two are people who would purchase opposite what they own. A simple reason for this is they are not satisfied with the performance of the product they own and would choose to purchase a product with more or less functional-

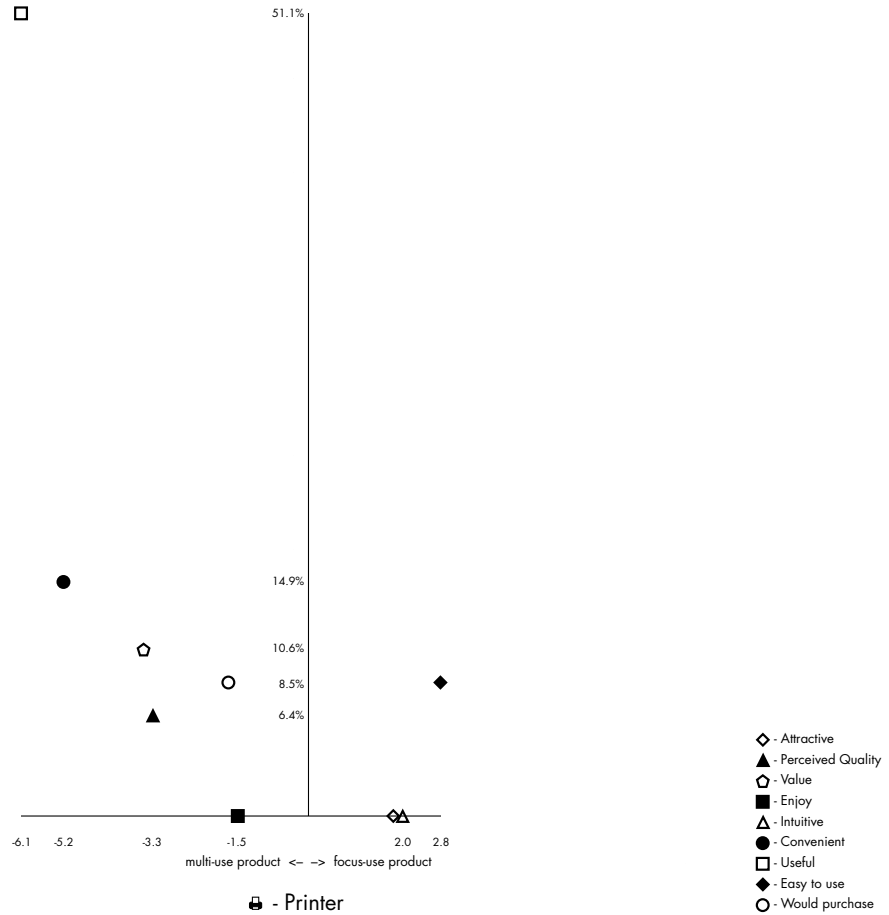


Figure 10: Printer graph

ity. Those owning a multi-use device that would purchase a focus-use device have probably discovered a single activity needing to be best accomplished. Those moving from a focus-use to a multi-use device could be attracted to the functionality they envision themselves taking advantage of at a later date. It is this flexibility that people value even when it is not used. [Odlyzko].

Within the figure 8 graph, the printer is farthest to the left, representing the product most likely to be purchased as a multi-use version. The printer product graph in figure 10 shows “useful” also having the highest multi-use score and is the most important trait by an almost two to one margin. Across this data, “useful,” multi-use printer, and importance are very related. To reinforce the association of useful with multi-use products, the printer input/output map, figure 11, gives a visual representation. The greater number of multi-use printer

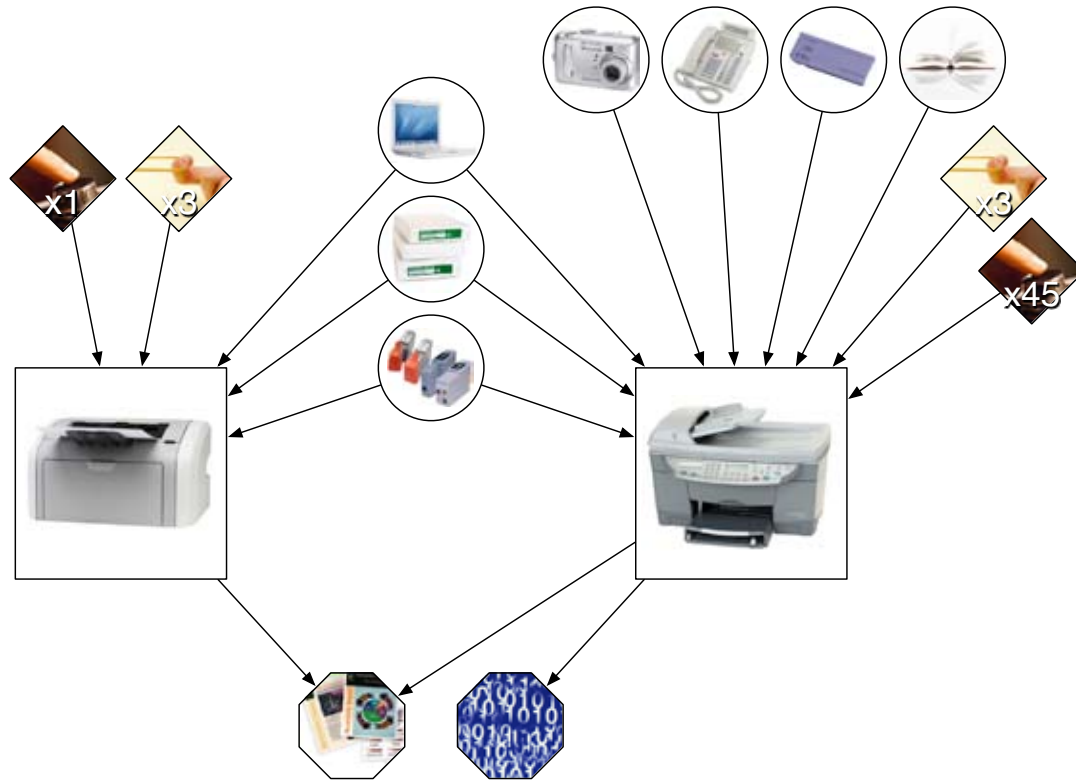


Figure 11: Printer input/output map

inputs and associated artifacts shows the tremendous flexibility of this product. While many purchasers of the multi-use printer may not use all of the afforded inputs, the preparedness for future activities is desirable.

The Price of Flexibility

The advantage multi-use products gain in flexibility, they lose in intuitiveness and ease of use. The useful trait graph shows every product on the multi-use half of the graph while the “intuitive” and “easy to use” graphs show every product in the focus-use side. In addition, there is a tendency for “intuitive” being of lesser importance when “useful” is of considerably high importance. When people go to purchase a product that they deem highly useful, they don’t believe that their understanding of its function is important. If the need arises, they will figure out how to use the multitude of functions, but preference is given to having them available. A product designer would naturally want to increase their audience’s perception of usefulness and intuitiveness in a product, but the data shows if “useful” is important,

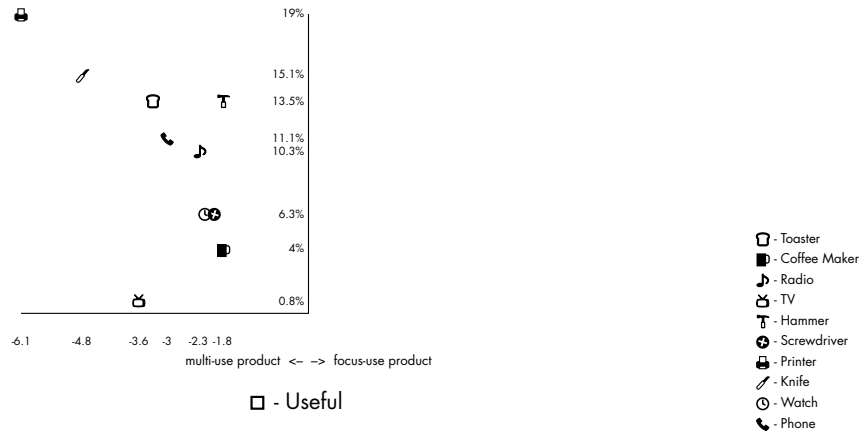


Figure 12: “Useful” graph

“intuitive” is relatively unimportant. The most basic items on the hierarchy of needs, such as functionality and reliability need to be fulfilled before considering higher needs like usability.

The disparity between “useful” and “intuitive” is understood through the design theory of the flexibility-usability trade-off. The flexibility-usability trade-off explains how an audience anticipates future uses of a product is key indicator of how they will value the flexibility or usability of a design. [Lidwell] People who are unable to anticipate their future use of a product may hope to benefit from a flexible, multi-use design. They have some existing needs that define the general product category, but the product’s flexibility addresses more

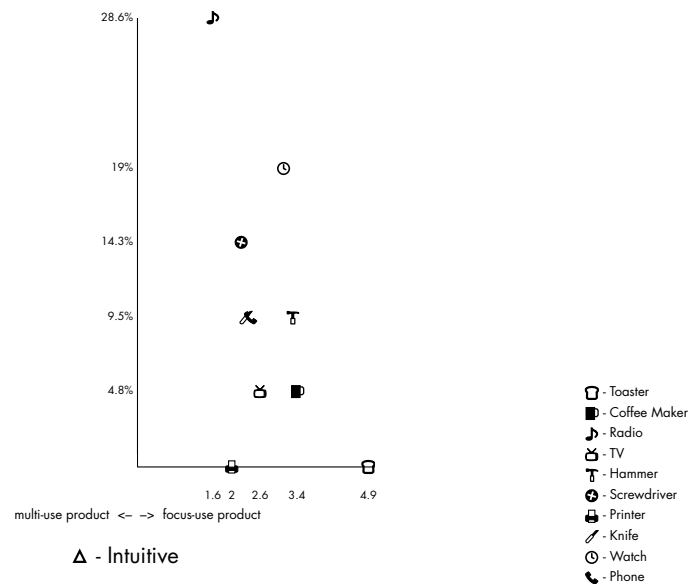


Figure 13: “Intuitive” graph

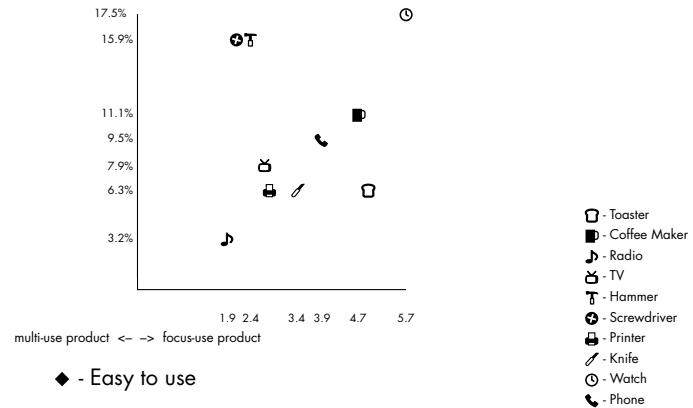


Figure 14: "Easy to use" graph

potential needs than existing needs. The additional features may come in handy later on, but their incorporation into the product is more of a convenience and not based on their direct assistance to a well defined activity.

The convenience of a product is also related to how people anticipate future uses. Across all product graphs with "useful" as the most important trait, "convenient" is typically the second most important. This paper defined convenient as, "fitting in well with a person's needs, activities, and plans" and through the convenient trait graph, figure 15, this definition is more heavily associated with multi use products. Determining a convenient product, by definition, would require a person to understand their needs, activities, plans, and how such a product would fit. This seems counter to the flexible multi-use product described above, except when an individual is uncertain of their needs, they may place a high degree of impor-

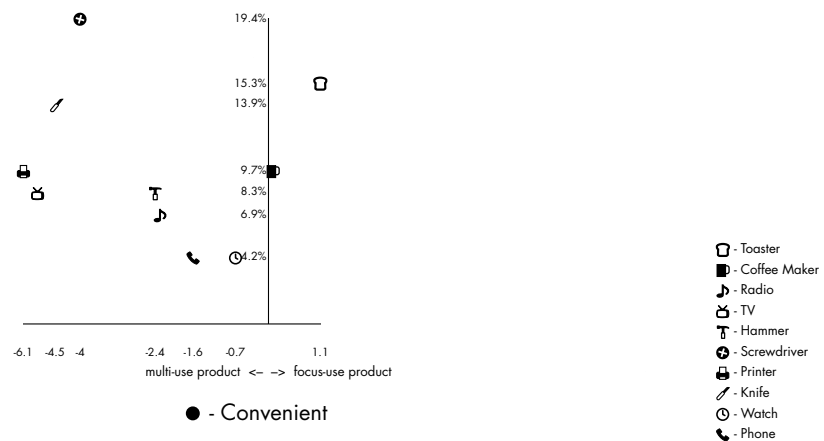


Figure 15: "Convenient" graph

Product	"Useful" & "Intuitive" Dif.
Printer	51%
Knife	36%
Toaster	36%
Hammer	32%
Phone	26%
Radio	15%
Screwdriver	11%
Coffee	9%
Watch	9%
TV	0%

Figure 16: “Useful” & “Intuitive” difference table

tance on a product to anticipate and fulfill those needs. Their inexperience and uncertainty of activity means they more likely trust the potential benefit of the device and its technology.

At times, the product designer can anticipate and create potential conveniences for an audience that can't foresee their own needs. Many products such as PDAs have had considerable success at introducing technology conveniences, but when a user is looking for a “useful” product they don't place much importance on how “intuitive” that product will be. If an individual can't anticipate their potential uses for a device, they can't very well anticipate if the device will be intuitive.

When the level of importance placed on a product's usefulness and its intuitiveness varies greatly, its potential functions are poorly communicated. This unclear purpose and emphasis on features is a trait of device-centric convergence. Figure 16 reviews the amount of “useful” and “intuitive” importance separation in each of the product graphs. In all cases, “useful” scored a higher rating than “intuitive” and the table lists the difference between the two scores. For example, the 32% for the hammer is derived from 36% importance in “useful” minus 4% in “intuitive.”

Here is where we start to see some distinctions between device-centric and activity-centric convergence. People who can clearly anticipate their future uses of a product will choose a focus-use product or a multi-use product that is more activity-centric than device-centric. These users are looking to fulfill an existing need or an anticipated, yet well-defined need.

The technology required to fulfill their needs is stable and familiar enough that users understand and anticipate the benefit. They can evaluate their goals, then choose a product with compatible functions that best matches those goals. When choosing between a number of similar products with functions that match the defined need, the product that best communicates the use of those functions will be deemed superior. Across a number of similar products, the “usefulness” of a product is more related to the underlying technology and is taken for granted. The actual use of the product is more vital to the product’s worth. Thus, in the transition away from device-centric convergence, activity-centric products have a lower disparity between “useful” importance and “intuitive” importance.

Similar Inputs Portray Similar Function

Activity-centric products portray a more straight-forward understanding of their function. They are designed with inputs and controls matched to a set of tasks performed by a target audience. Maintaining or diluting the understood function in a new product is achieved by affecting the available inputs and controls. Through this data, I believe there is a correlation between the number of available inputs and controls on a product and the relative function people understand that product to perform. When two similar products are adjacently displayed, the number of input affordances affects whether people believe the products to perform similar functions. The greater the discrepancy in inputs, the greater the discrepancy in understood function.

From the survey, an initial question for each product in paired groups was to “Name the primary function of this item”. Each respondent’s answer to this question was reviewed for parity within product categories. If the primary function of the focus-use toaster was listed as “toasting” and the primary function of the multi-use toaster was also “toasting”, that pair scored a one. If the primary function of the focus-use printer was “printing” and the primary function of the multi-use printer was “office work”, that pair would score a zero. Product category responses were tallied to give an overall percentage rating of perceived function parity. The lower the percentage, the less respondents believe a product category’s multi-use and focus-use version perform the same function.

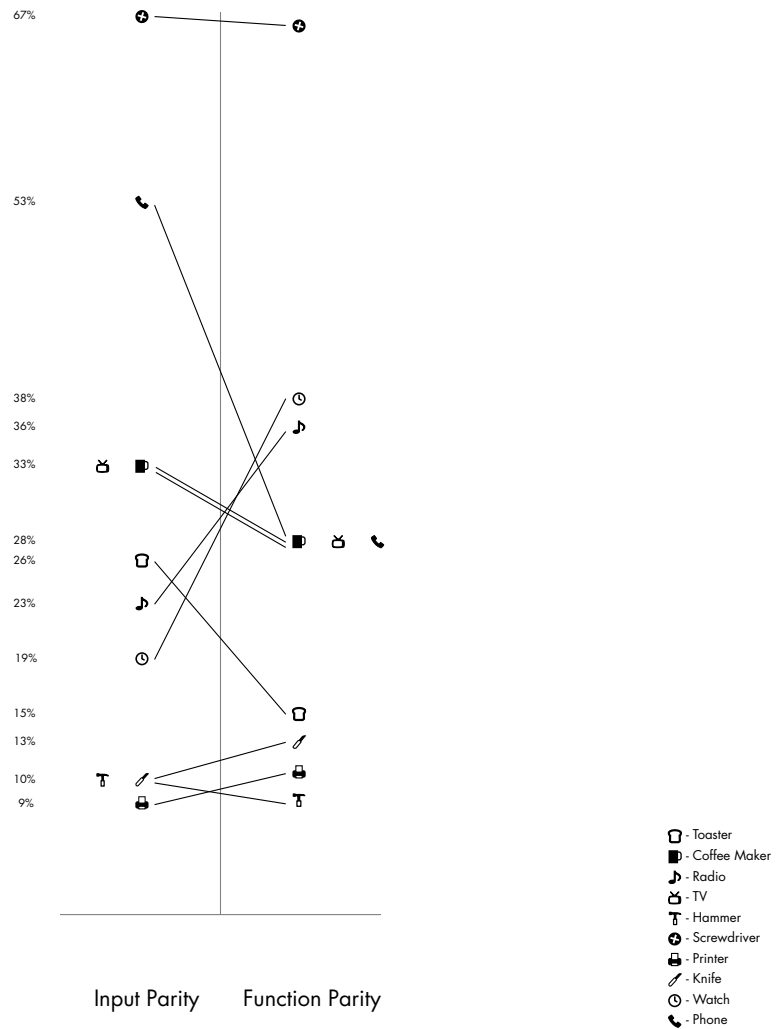


Figure 17: Input parity versus Function parity graph

In the creation of the input/output maps, the number of human interaction points were tallied for each product. The tallies for each product were then converted to percentages of similar input affordances between a focus and multi-use product category. For example, the focus-use radio has three dial inputs. The multi-use radio has 11 button inputs and two dial inputs. This creates a ratio of three total focus-use inputs to 13 total multi-use inputs, or 23%. The greater the input number parity, the higher the percentage ranking. The lower the input number parity, the lower the percentage ranking.

The resulting graph, figure 17, displays two sections of points, plotted along the y-axis.

The x-axis in this graph is disregarded as we are only looking for changes happening in one

Product	Input Parity	Product	Function Parity
Printer	9%	Hammer	9%
Hammer	10%	Printer	11%
Knife	10%	Knife	13%
Watch	19%	Toaster	15%
Radio	23%	Phone	28%
Toaster	26%	Coffee	28%
TV	33%	TV	28%
Coffee	33%	Radio	36%
Phone	53%	Watch	38%
Screwdriver	67%	Screwdriver	66%

Figure 18: Input parity versus Function parity tables

dimension. Products with identical y-axis data are plotted adjacent to one another. The left column plots the percentage of parity input affordances while the right column plots the percentage of respondents believing the product pairs have the same function. The lines between help to visually gauge the change in product category percentages between columns.

Products maintaining a similar rating in both columns best confirm the initial belief of a relationship between human interaction points on a product and perceived relative function. The printer, hammer, knife at the bottom of the chart have a large discrepancy between the number of inputs on the multi-use and focus-use products. Coincidentally, the least number of people believed that those product pairs performed the same function. The coffee maker and TV also maintain a relatively stable position across columns and their higher position on the graph means that they have relatively good input-parity and understood function-parity. The screwdriver at the top of the chart has a very good input-parity and function-parity. This would indicate that the design of the multi-use screwdriver performs very well in bringing together related components while maintaining a solid relationship to the activity-centric, focus-use version.

The radio, watch, phone, and toaster all have somewhat dramatic changes within the graph. The positive change from input-parity to function-parity demonstrated by the radio and watch could mean that those products have a strong relationship to their activity, regardless of their form or human interaction tally. Adding buttons or dials to either of these products makes little difference in people's understanding of its use. Products like these give designers

a great amount of flexibility in determining form with users still able to grasp the product's functionality. The phone and the toaster's dramatic negative change from input-parity to function-parity could indicate the opposite effect. Perhaps the form-language for a product with this graph is very well defined and users are sensitive to changes, despite a relatively common number of controls. The focus-use phone and toaster have an almost iconic form that people easily identify and associate with a basic function. While both dramatic positive and negative change across this graph could represent a very helpful set of data for designers, I believe additional research must be done to verify the positive and negative slope relationships.

For the product designer examining device convergence, this data points to a number of well understood design principles that can help guide successful design. The form given to a product should help communicate its function. The axiom "form follows function" from a user's point of view, associates the provided inputs to the function of the device. If the inputs are of a certain type, then the user will believe the function to also be of a certain type. Two products with disparate forms will convey two disparate functions.

Some input forms are also better suited to some functions than others. The dials on the radio are well suited to being turned, but not slid or pulled. These physical characteristics that influence a product or an object's function are known as affordances. [Lidwell] If a designer is looking to increase the understood function of a product, the proper use of device affordances should be a priority. When evolving a product or setting out to design an entirely new product, affordances are derived from knowing what other products and experiences your target user is familiar. Mimicking aspects of these other products allows the designer to leverage their target user's existing knowledge and lowers the learning curve. Affecting a product's affordances and similarities to other products can influence a user's perception of how "useful" and "intuitive" a product is in relation to other products.

If we revisit the earlier table, figure 16, that displayed the difference between "useful" and "intuitive" across products, there is a clear pattern starting to emerge. The divisions displayed in input-parity and function-parity very closely mirror the divisions created in the

“useful” and “intuitive” difference table. The same group of products– printer, hammer, knife, and toaster– reoccur in the top positions in all three tables. Comparing their focus to multi-use versions, the consistency points to aspects of device-centric convergence: poor perceived function parity from focus to multi-use version products, a large difference in the number of input affordances provided, and a high discrepancy in the difference of “useful” and “intuitive” traits.

Attractiveness Bias

The analysis has outlined the traits of device-centric convergence, but there is data related to activity-centric convergence and the products whose orientation has not been clearly defined. The idea that activity-centric products have a lower disparity between “useful” and “intuitive” traits is derived less from what activity-centric convergence is, and more from what it is not. Some positive correlations must be made to help product designers when aiming to increase the usability of a product. One of the first positive correlations to arise in the overall product graph is amongst “intuitive,” “easy to use,” “attractive,” and focus-use products. As stated earlier, the focus-use versions of products are considered activity-centric by nature but how the traits relate are found within the data and other studies.

The data points to a theory in design that connects the aesthetic beauty of a product with a

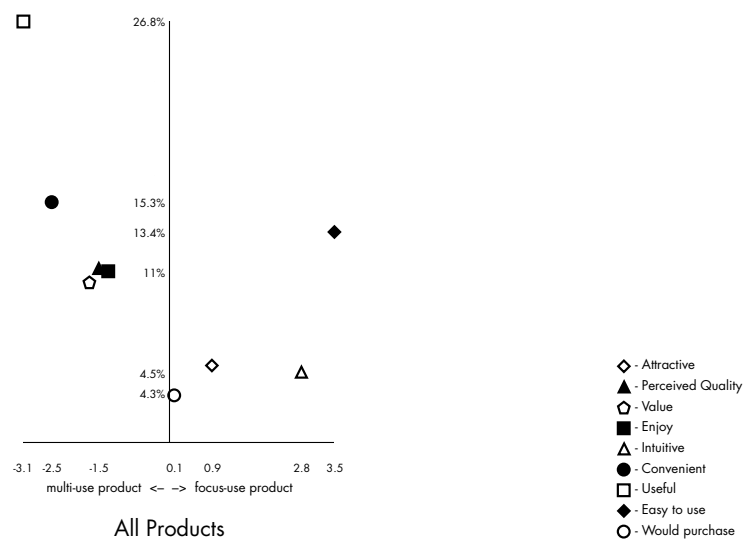


Figure 19: All Products graph

perceived increase in that design's ease of use. Masaaki Kurosu's study in 1995 suggests that a user may be strongly affected by the aesthetics of a product even when they try to evaluate its functional aspects [Kurosu]. If the product is repulsive, there will be less interest in discovering and making use of its function. People have a more positive response to using a product when the product is more aesthetically pleasing. Even in people's relationships with other people, attractiveness plays an important role. Attractive people, similar to attractive products, are generally perceived more positively than unattractive people. This attractiveness bias has been known to affect hiring decisions, leniency from juries and judges, and election results. [Lidwell]

Many companies spend a great deal of money on usability testing to ensure their product is able to perform complex tasks with relative ease. As attractiveness has been found more closely associated with focus-use, activity-centric designs, it becomes that much more important for designers to understand and refine the beauty of a complex, multi-use device. When the need for a flexible, multi-use product is uncertain, good aesthetics can greatly help a user feel more comfortable and confident. This does not guarantee that the design is actually easier to use, just that it is perceived in such a manner. This positive initial impression of a product can help long-term acceptance and attitudes toward quality and enjoyment.

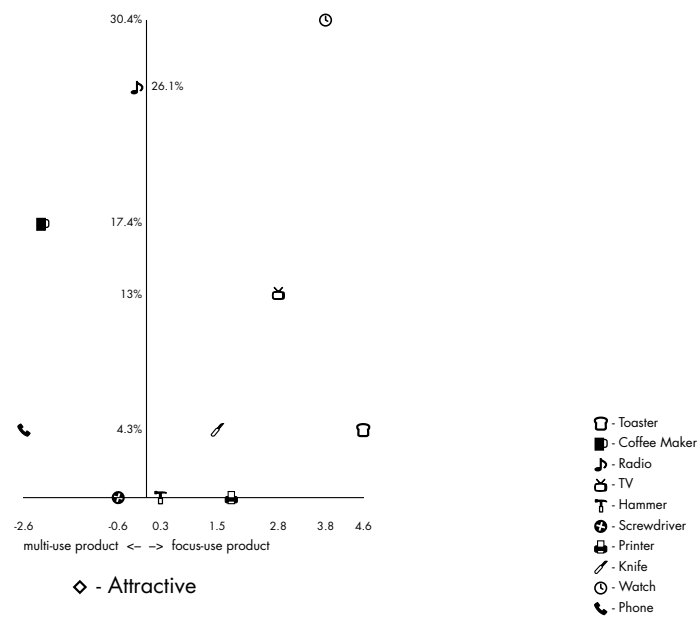


Figure 20: "Attractive" graph

Joyful Products

The importance of enjoying a product creates some distinctions between device and activity-centric products. While most respondents said that multi-use products were typically more related to “enjoy,” there are two products in which this trait was found to be particularly important. The coffee maker and TV are far above any of the other products collectively taking more than fifty percent of the enjoy trait response. Neither of these products show the earlier outlined trends of device-centric convergence and the four products that did, the printer, knife, toaster, and hammer all show enjoyment as relatively unimportant. The coffee maker and television have some insight into the traits of an activity-centric device.

Enjoy a Cup of Coffee

In the “enjoy” graph, the coffee maker is rated highest in regards to importance with 27.5% of the response and is the second most multi-use associated product. These data display that people feel coffee is a product to take pleasure in and most people find that association with a device that provides multiple coffee-related beverages.

“Convenience” is also a highly important trait of the coffee maker, though respondents were relatively neutral on the relation of convenience to a focus or multi-use product. There could

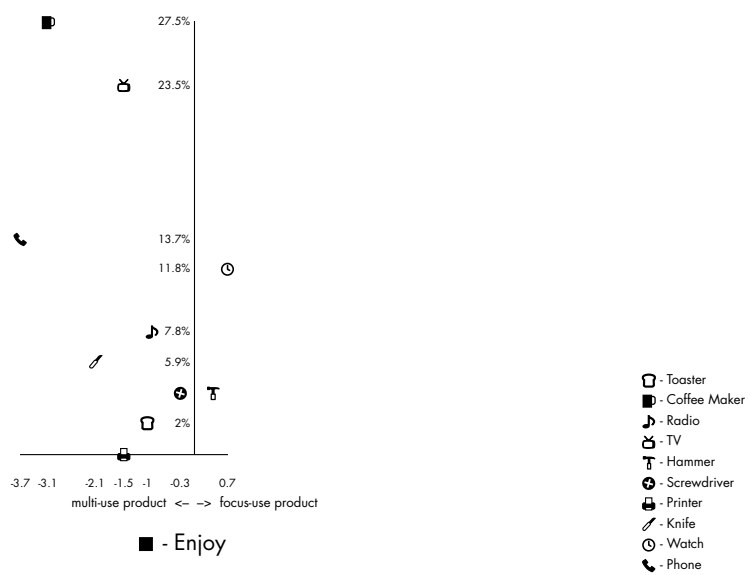


Figure 21: “Enjoy” graph

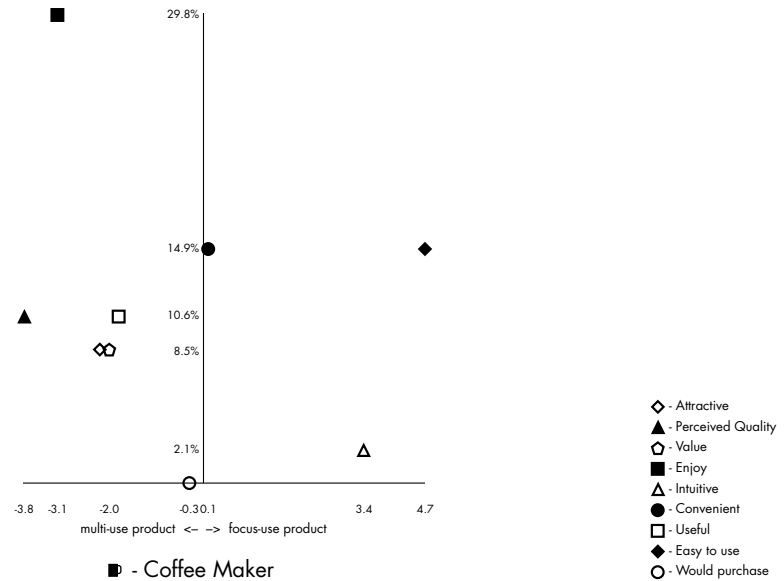


Figure 22: Coffee Maker graph

be a perception of convenience dealing with the use of the coffee maker in the creation of a coffee beverage. This demonstrates a distinct understanding of the product's expected use and views the multi-use components as cohesively beneficial in accomplishing that goal. As described earlier, this version of convenience is cohesive with activity-centric convergence. The other possibility is convenience related to the general environment associated with coffee making. Typically coffee is consumed in the morning when people are groggy and trying to hurry about their business. The use of the machine must fit well into their regular routine and not require a great deal of attention and fuss. This understanding of convenience would be more associated with a focused-use coffee maker and ties in with ease of use, which is of

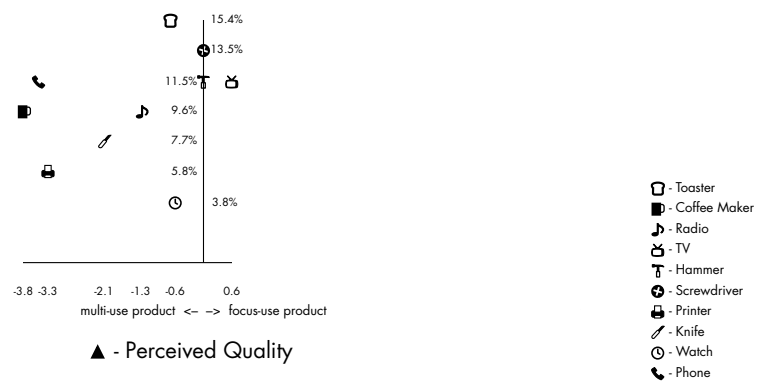


Figure 23: "Perceived Quality" graph

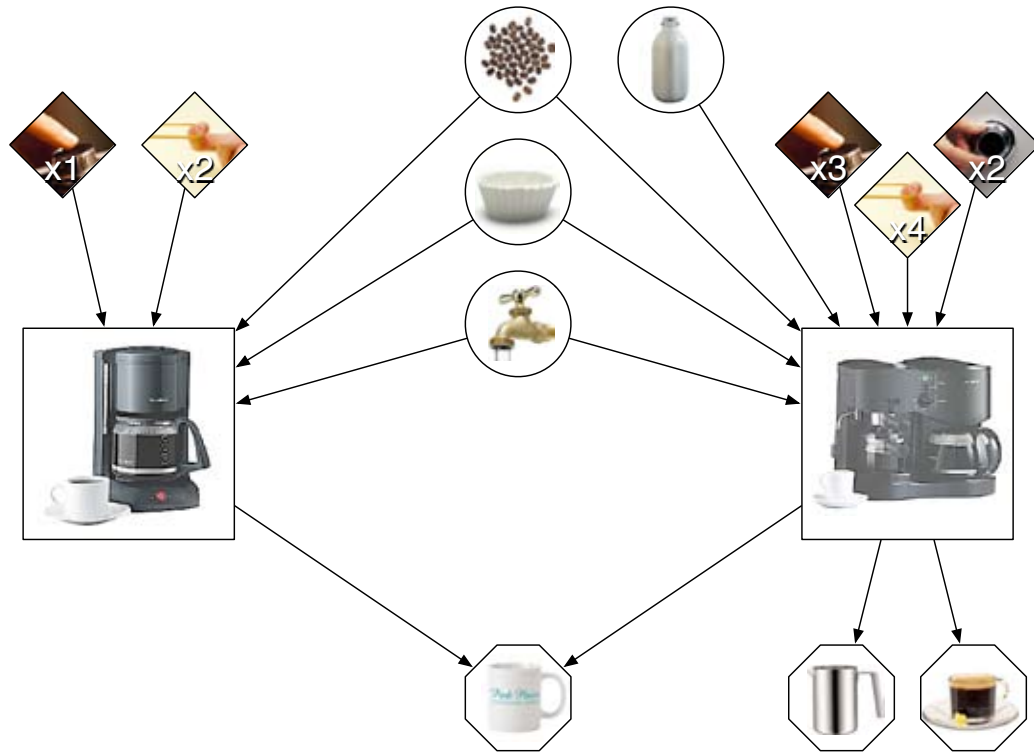


Figure 24: Coffee Maker input/output map

equal importance to convenience but definitively a focused-use trait.

“Perceived quality” is the most multi-use related trait on the coffee maker product graph, figure 22, as is coffee maker the most multi-use product on the “perceived quality” trait graph, figure 23. This, like convenience, could be interpreted in two different manors. The first possibility is people believe the multi-functional device is of higher quality from a basic visual critique. The knobs, buttons, and form-language of the multi-device may seem to have a better build, better materials, and generally superior appearance. The second possibility is related more to the coffee-beverage created by each of the devices. The focus-use coffee maker produces solely coffee, while the multi-use coffee maker produces coffee, espresso, and steamed milk. These extended coffee-beverages are typically more luxurious and when combined and mixed with additional flavors they relate less to the working man’s cup of Joe, and more to the fluffy flavors of Starbucks.



Figure 25: Philips Senseo coffee maker

Philips has gone to great lengths to bring the same perception of quality, enjoyment, and convenience through its Senseo coffee maker. The Senseo has taken all of the required aspects of coffee making and incorporated them into a single product. Tightly integrating water, filter, and coffee while minimizing the number of interaction points, Philips now emphasizes the emotional aspects of quality and enjoyment. The initial hierarchy of needs, functionality, reliability, and usability have all been addressed, leaving the Senseo to appeal to the highest levels of need. This focused purpose and de-emphasis of utility shows how as a technology stabilizes, activity-centric products appeal more to emotions.

What's on TV?

The TV is another product that ranks very high in the “enjoy” graph. As an entertainment product, it is expected that people would not put a great deal of importance on a TV’s usefulness, but the high importance rating of “value” was a surprise. Since both “enjoy” and “value” are related to the multi-use TV, it is assumed that the combination of a TV screen, DVD player, VCR, and media card reader are primary contributing factors. These products could be purchased individually and their combination relieves component redundancy, but I believe that their merger into a single device is step toward activity-centric convergence.

As seen in the input/output map for the TV, figure 28, the input to either TV version is output as images and sound. DVD discs, VCR tapes, media cards, broadcast signals, and game consoles are all distribution methods carrying very related versions of the same content. DVDs are the evolution of VCR tapes for distribution and playback of movies, broadcast

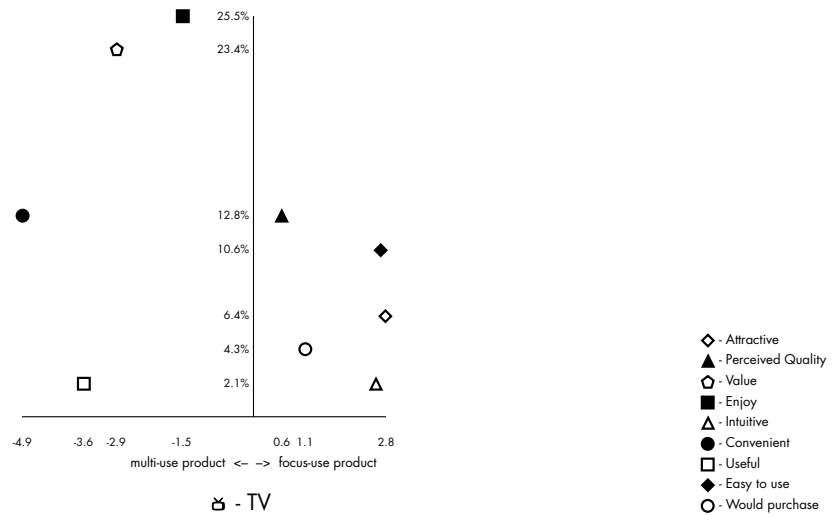


Figure 26: TV graph

signals provide more direct programming content, and media cards and game consoles give more specialized content though still consumed in audio and video format. All of these media transmit their content through a television that performs the activity of audio and video playback. The convergence of audio and video content and distribution is constantly being destabilized with new technologies such as VHS versus Beta, HDTV, Blu-Ray versus HD-DVD, cable, satellite, and internet programming formats. What all of these unsettled formats commonly converge toward is consumption through the television.

The enjoyment of all these media are more related to a multi-use TV, but what is not related

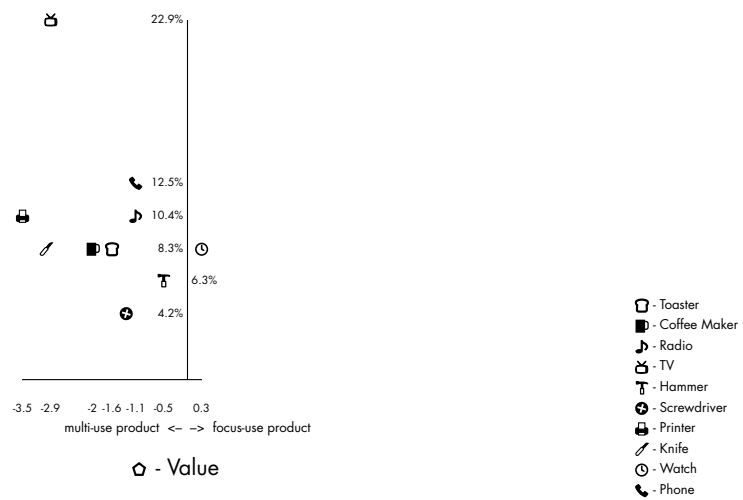


Figure 27: "Value" graph

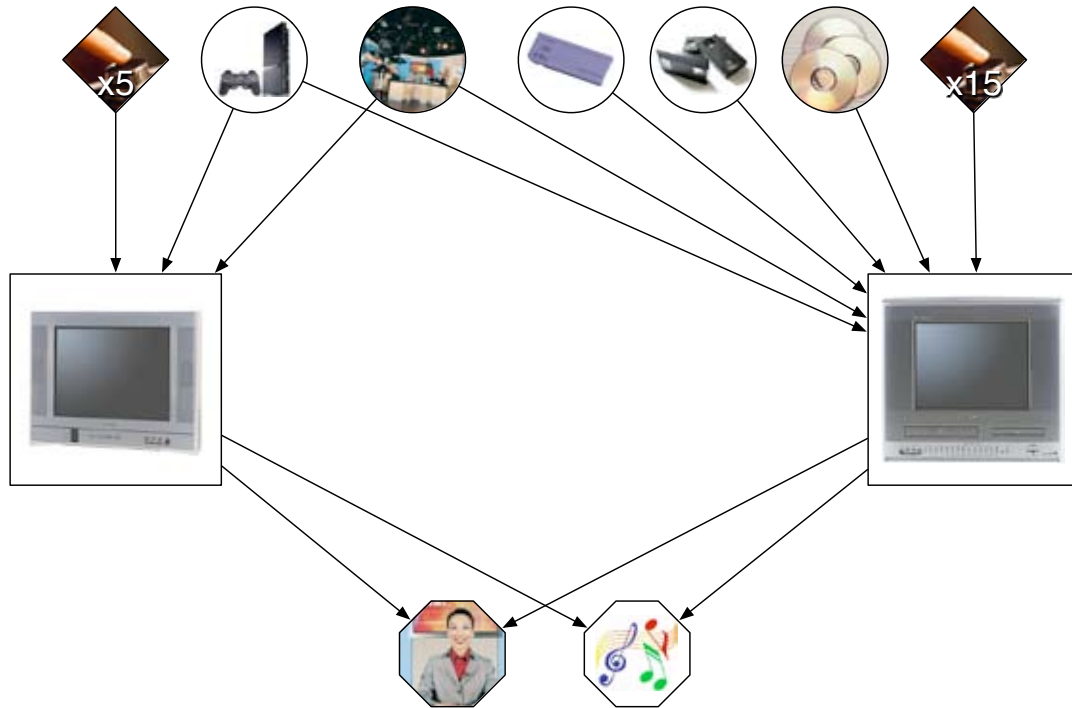


Figure 28: TV input/output map

is attractiveness, ease of use, and intuitiveness. A relation between these traits has already been established, but in the case of the television, their disconnect with the multi-use device can be better explained through the disconnect of content and distribution sources. The minimal number of buttons and inputs on the focus-use device certainly gives an intuitive, clean, and friendly appearance. This sacrifices flexibility, but as convergence within content and distribution settle, the required number of buttons, controls, and physical media should decrease. The multi-use TV has a number of buttons that relate to the playback and control of multiple media sources that all provide similar content. As the variation in consumed media types stabilizes, product designers can focus the form of the product even more toward its associated activity.

The consumption of media relates the value and enjoyment of TV in a similar way to the perceived quality and convenience of the coffee maker. What people are evaluating could be the device itself and its flexible number of inputs and related artifacts. The rich range of content used and associated with the multi-use TV increases its worth, though the content itself

could be influencing people's evaluation of enjoyment and value. Just as coffee is the desired goal of a coffee maker, audio and video media is the goal of a television. The product being consumed by users is not as much the physical TV or coffee maker but the content each delivers. Because people understand each product's use, usefulness is not seen as a highly important trait. The multi-use versions of both products combine related tasks and components for users to enjoy that product's primary activity. This is possible because the necessary technologies to support those tasks have matured to the point where designers can address higher level needs beyond functionality.

Take It With You

Within the survey, there are a group of products that people carry with them. The knife, phone, and watch are considered "Personal" items and when compiled, their data show a counter-point to established technologies progressing toward activity-centric convergence. Such as, the knife and phone show the same useful-intuitive importance discrepancy as products with device-centric convergence. Swiss Army knives have been produced for over 100 years and the design has reached such an iconic level in today's society, its name is commonly used as a metaphor for multi-use devices. The combination of screwdrivers, scissors, pens, corkscrews, saws, and up to 33 total features in single device do not aid in accomplish-

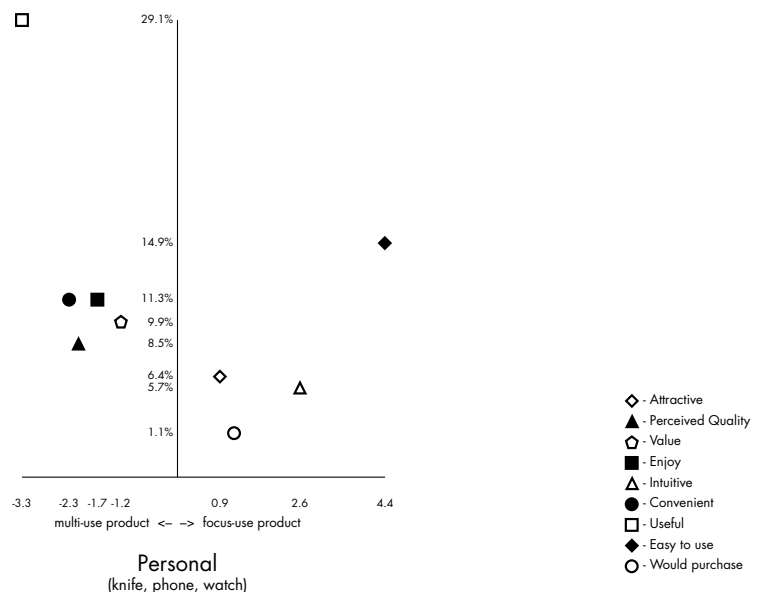


Figure 29: Personal graph

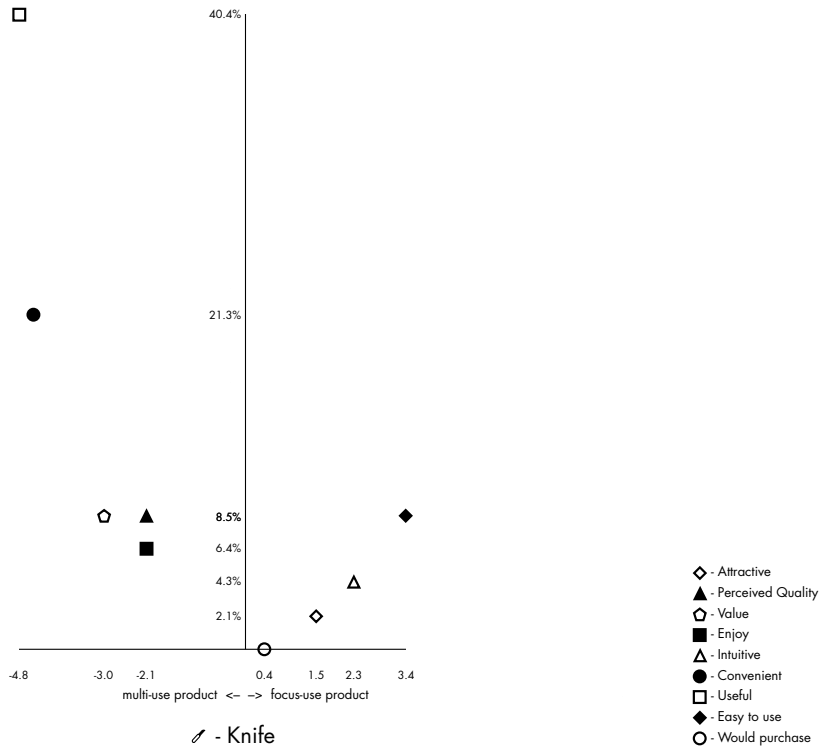


Figure 30: Knife graph

ing a single focused activity. What the data do show is that such a combination of features is important in being very useful and very convenient. As the established Swiss Army knife and other products are not wholly evolving toward activity-centric convergence, I believe personal products have a different emphasis in convergence than products existing in a person's environment.

The cell-phone is a product that, like the Swiss Army knife, is attracting a large number of various functions into a single form. What was initially a basic device for placing calls now has the ability to send messages, browse the web, check email, and take photos. The newest of designs seem to continue this trend with advanced gaming, camcorders, and even digital wallets for next generation payment methods. The continued grouping of features, corresponds to the reported high importance of usefulness in phones. Also important is the enjoyment of such devices, similar to the television and coffee maker. This combination of usefulness and enjoyment conveys that the evolution of the cell phone is moving toward more functionality while creating an emotional connection. Even in an area of disruptive

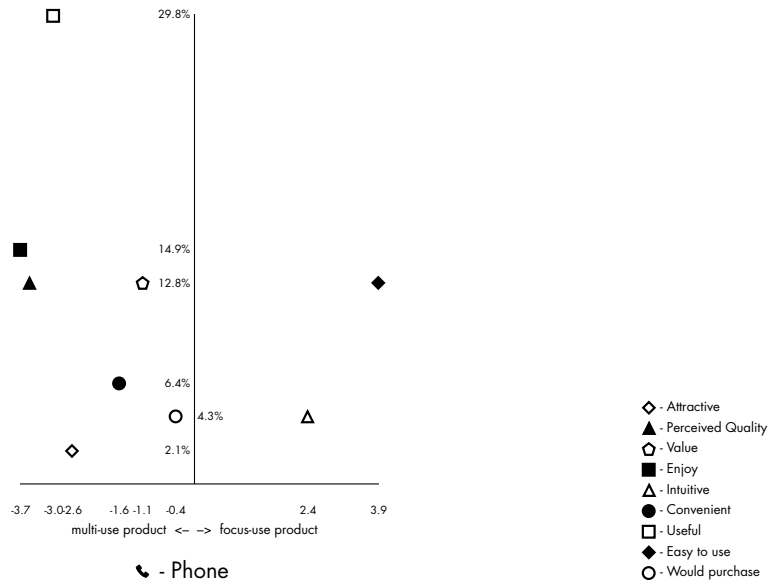


Figure 31: Phone graph

technology, adding more features to this personal device creates greater enjoyment. This is very different from other surveyed products like the printer, toaster, and hammer that share a high importance on usefulness but have a negligible importance on enjoyment.

The watch, figure 32, represents another important combination of traits not shown in other products. While respondents felt strongly about the focus-use watch across most traits, attractiveness and ease of use were most related and quite important. See figure 20, Attractive graph and figure 14, Easy to use graph. Compared to all other products in the trait graphs, the watch was most important and very focus-use related. Attractiveness is considered as important as usefulness and when the visual appeal of a product is as important as the features, it becomes a fashion item. Unlike the pocket knife, the watch is a highly visible body-object that reflects the wearer's social status, taste, and style. The high aesthetics of these fashion items, as mentioned earlier, influence their perceived ease of use, giving designers an opportunity to address two major priorities at once.

Products that exist within a person's environment will evolve toward activity-centric convergence while those that people carry with them have a complex set of requirements relating to convenience, entertainment, and fashion. Because of the limited space and a desire to not

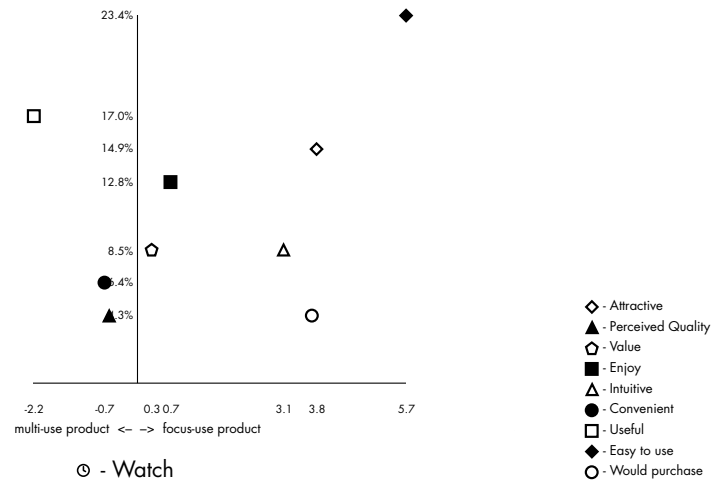


Figure 32: Watch graph

have bulging pockets, device-centric convergence can benefit some of the products people carry on their person. If a watch is made to receive telephone calls, unlock doors, pay for meals, and start a car then a user can do away with all the redundant devices carried in pockets everyday. Though, misplacing the watch would be disastrous and instead of carrying one entirely converged device, people may be content with carrying 3 semi-converged devices. The difficulty for designers is that body-object products must remain attractive and easy to use if people are expected to fashionably attach it to themselves and interact with it throughout the day.

A number of companies designing personal technology products understand the need for aesthetics. Mobile leader Nokia has devoted a whole website to the culture of mobility and has released a number of very fashion-forward products. [Nokia] The Nokia 7370 and 7280 are cell phones that place most of their attention on aesthetic needs, while the Nokia Medallion is a fashion necklace that displays images, the time, and photos sent to it from another device. Oakley released a refined version of their Thump MP3 player sunglasses that better integrates the ear buds and controls into the stylish eye-wear. Watch makers Suunto and Fossil designed watches based on Microsoft's SPOT technology that can receive transmitted news and information. Though, since its introduction 3 years ago, only a handful of SPOT watches have been released and a number of manufacturers have left the market entirely. While many of watches were aesthetically pleasing, the bulk and relative complexity of the



Figure 33: Personal fashion devices

device has kept the majority of users away.

Designers understand the need for trade-offs, and as people more intimately interact with products the benefit of device-centric convergence clashes with what are clearly activity-centric traits. As the technology evolves, attractiveness and functionality may be less at odds, but for now designers should focus on the aesthetics of visible body-object products, the entertainment and enjoyment of portable digital devices, and the convenience and utility of pocket multi-tools.

CHAPTER 4

CONCLUSION

Designers can develop better products by understanding the influence of convergence. This paper has given a language and framework to convergence and outlined established guiding principles. In addition, some best practices will help designers match evolving, convergent technologies into user needs. Figure 36 reviews the facets of convergence and the various traits defining device-centric and activity-centric products.

If the technology used in your product is relatively new to your users, converge various functions related to that technology. Try to foresee what activities will be drawn to the technology and how your product can be flexible enough to fulfill its user's uncertain needs. During these early, disruptive technology periods, device-centric convergence dictates that product designers focus on flexibility. As Rogers found, the early adopters are a small percentage of the population and may tolerate, or even seek out, new products with technology that isn't fully matured. By designing flexibility into your product, the early adopters will help to

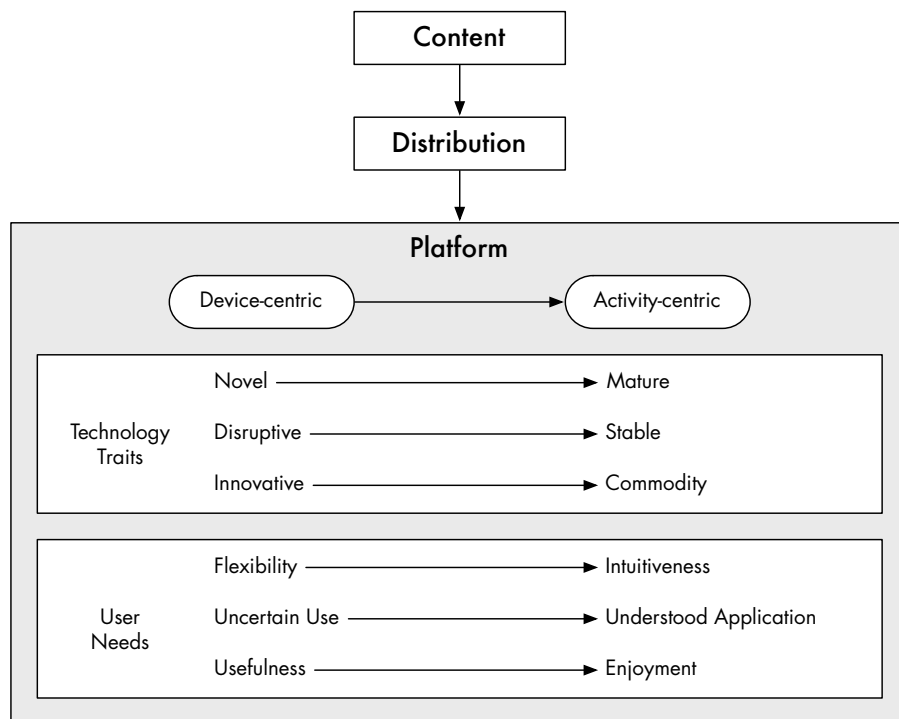


Figure 34: Convergence overview

discover primary activities associated with the technology.

Designers should begin to focus on ease of use and intuitiveness as more people comprehend how the technology benefits their lives. Through device-centric convergence, best practices and activities suited to the technology will emerge. Users will focus specifically on accomplishing those activities and designers can best fulfill that need by developing products that are intuitive and easy to use. As the attractiveness bias explains, designers can increase this level of intuitiveness and ease of use by giving more attention to product aesthetics. The emphasis on ease of use demonstrates a middle period where technology, product language, and controls begin to settle into optimal strategies. Designers need to create style guides and plans for communicating the abilities of their products as users realize their needs and shift away from flexibility toward activity-centric convergence.

In effectively communicating abilities, those designs that incorporate new technology or converging features should pay particular attention to the human interaction points. To keep a strong function association with a previous design, keep the number of inputs similar. If the new design needs to distinguish its functionality from a previous design, changing the number of human interaction points is a viable strategy.

An area this paper lightly touched upon is the positive and negative relationships between the inputs and functions within a product pair. As was theorized, product forms that have an iconic association with their function are sensitive to redesigning. A designer can leverage this product language to convey a function, but deviations in the number and type of inputs will disrupt people's understanding of the device. Alternatively, when the function of a product is clearly understood by a user, the designer has more flexibility in deciding the forms and inputs. These concepts are clearly beneficial to advanced product design, but their validity could benefit from further research.

Once the diversity of product forms and controls have settled and are understood by users, designers should attend to the experience and enjoyment of the product. The designer needs to think beyond solely platform convergence and also design for the influencing content and distribution methods. These additional product considerations are best viewed through the

framework of activity-centric convergence. A designer must clearly define the activity being performed, the required peripheral artifacts, and the points of human interaction. If the related facets of a product are tightly integrated, the user experience and emotional attachment with the product will increase.

The Tivo is a model of such activity-centric convergence creating an engaging product with a loyal user group. As an evolution of the VCR, users are comfortable with the technology and general activity. The basic tasks include “recording shows”, “browsing shows,” and “watching shows.” Within the Tivo, these are accomplished by recording and playback electronics, of which the user needs no technical understanding, and an on-screen interface. Also required for its use are a television (peripheral artifact), television shows (content), and a programming schedule (distribution). Because of the mature technology and tight integration between aspects of convergence, the Tivo designers emphasize the ease and experience of navigating the menus and enjoying television.

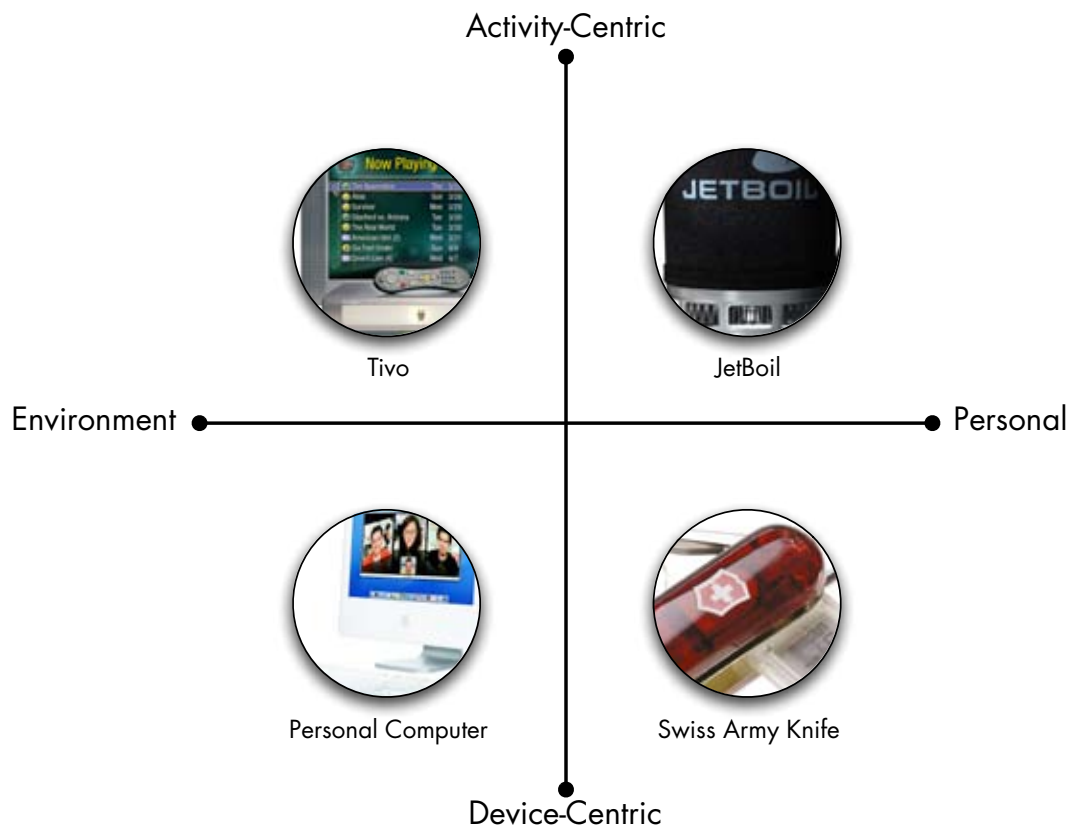


Figure 35: Convergence quadrants

Personal products also create an emotional connection with users, though such context emphasizes these needs through attractiveness and convenience. If the technology is still novel, designers should focus more on the convenience of device-centric convergence. This will make previously stationary tasks mobile and minimize the bulk of carrying multiple objects. As the technology matures, designers must give these products beautiful forms, especially if the device is designed to visibly attach to its user in some way. Converging designs into body-objects, such as eye-wear, watches, rings, necklaces, and headbands, need to be beautiful and very easy to use. If such attractiveness in device-centric convergence cannot be achieved, or if convenience is the primary goal, relegate the product to a pocket, purse, or briefcase. Figure 37 provides a breakdown of products related to device-centric and activity-centric convergence in the context of a personal product or environment product.

These design principles and best practices should dictate the development of a product through a convergent environment. Designers will continue to address this environment by evolving and refining product characteristics while new technologies create new device opportunities. Device-centric and activity-centric convergence each have their advantages, but understanding the technology's maturity and your user's goals will dictate which approach will be most successful.

Appendix A: Survey



Sex: Male Female

Age: _____

Profession: _____

Questions and scales on the following pages refer to the product images on that page. The choice you make on the scale will represent how much you feel that term applies to one product over the other.

Example:

<u>hugging</u>	← Name the primary function of this item →	<u>sleeping</u>
<u>yes</u>	Have you ever owned this item or one very similar?	<u>yes</u>
<div></div>		
<div><div><input type="checkbox"/></div><div><input checked="" type="checkbox"/></div><div>Soft</div><div><input type="checkbox"/></div><div><input type="checkbox"/></div><div><input type="checkbox"/></div></div>		
<div><div><input type="checkbox"/></div><div><input type="checkbox"/></div><div><input checked="" type="checkbox"/> Comforting</div><div><input type="checkbox"/></div><div><input type="checkbox"/></div></div>		
Please circle which single term is most important to you for this image-pair.		

pg. 1

_____ ← Name the primary function of this item → _____

_____ Have you ever owned this item or one very similar? _____



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg.2

← Name the primary function of this item →

Have you ever owned this item or one very similar? →



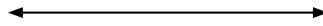
Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg.3

_____ ← Name the primary function of this item → _____

_____ Have you ever owned this item or one very similar? _____



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg.4

_____ ← Name the primary function of this item → _____

_____ Have you ever owned this item or one very similar? _____



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg.5

← Name the primary function of this item →

Have you ever owned this item or one very similar? →



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg.6

_____ ← Name the primary function of this item → _____

_____ Have you ever owned this item or one very similar? _____



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

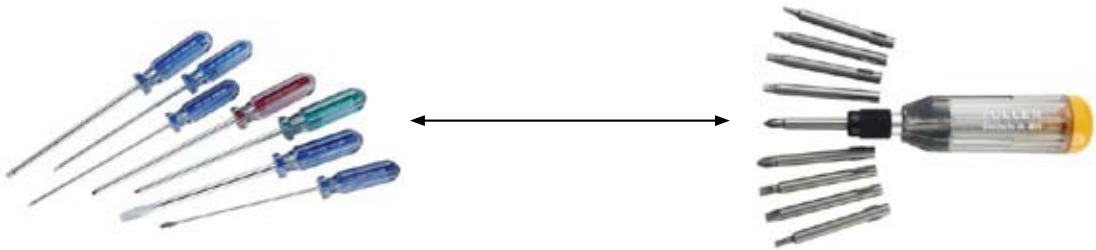
Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg.7

_____ ← Name the primary function of this item → _____
 _____ Have you ever owned this item or one very similar? _____



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg. 8

← Name the primary function of this item →

Have you ever owned this item or one very similar? →



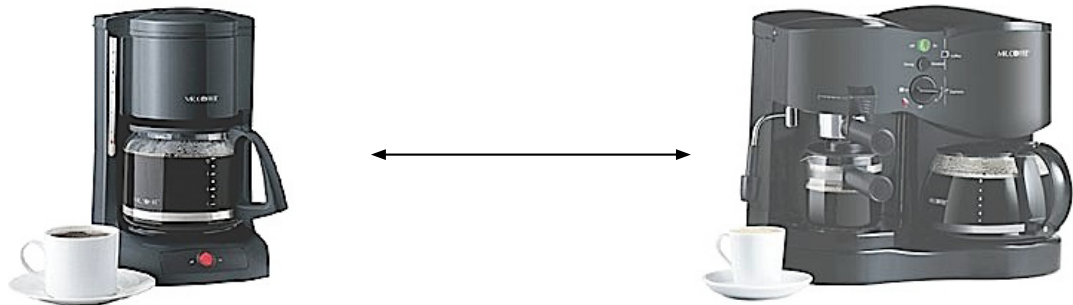
Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg. 9

_____ ← Name the primary function of this item → _____

_____ Have you ever owned this item or one very similar? _____



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg. 10

_____ ← Name the primary function of this item → _____

_____ Have you ever owned this item or one very similar? _____



Attractive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Perceived Quality				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Value				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Enjoy				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intuitive				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Convenient				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Useful				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easy to use				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Would purchase				
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please circle which single term is most important to you for this image-pair.

pg. 11

Appendix B: Raw survey data

Overall

Responses: 47	
Sex:	Male: 46.8%
	Female: 53.2%
Age:	Mean: 29
	Std Dev: 9
	Median: 26
	Mode: 21

focus/multi:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>	Total
Toaster	4.6	-0.7	-1.6	-1.0	4.9	1.1	-3.3	4.9	0.5	1.0
Coffee	-2.2	-3.8	-2.0	-3.1	3.4	0.1	-1.8	4.7	-0.3	-0.6
Radio	-0.2	-1.3	-1.1	-0.9	1.6	-2.3	-2.3	1.9	-1.1	-0.6
TV	2.8	0.6	-2.9	-1.5	2.6	-4.9	-3.6	2.7	1.1	-0.4
Hammer	0.3	0.0	-0.5	0.4	3.3	-2.4	-1.8	2.4	0.3	0.2
Screwdriver	-0.6	0.0	-1.3	-0.3	2.2	-4.0	-2.0	2.1	-1.5	-0.6
Printer	1.8	-3.3	-3.5	-1.5	2.0	-5.2	-6.1	2.8	-1.7	-1.6
Knife	1.5	-2.1	-3.0	-2.1	2.3	-4.5	-4.8	3.4	0.4	-1.0
Watch	3.8	-0.6	0.3	0.7	3.1	-0.7	-2.2	5.7	3.7	1.5
Phone	-2.6	-3.5	-1.1	-3.7	2.4	-1.6	-3.0	3.9	-0.4	-1.1
Total	0.9	-1.5	-1.7	-1.3	2.8	-2.5	-3.1	3.5	0.1	

misc:	Own	Own Dif	Inputs	Input Parity	Function Parity
Toaster	focus: 97.9%	25.5%	5	26.3%	14.9%
	multi: 72.3%		19		
Coffee	focus: 76.6%	48.9%	3	33.3%	27.7%
	multi: 27.7%		9		
Radio	focus: 42.6%	2.1%	3	23.1%	36.2%
	multi: 40.4%		13		
TV	focus: 95.7%	53.2%	5	33.3%	27.7%
	multi: 42.6%		15		
Hammer	focus: 100.0%	27.7%	1	10.0%	8.5%
	multi: 72.3%		10		
Screwdriver	focus: 100.0%	29.8%	2	66.7%	66.0%
	multi: 70.2%		3		
Printer	focus: 80.9%	31.9%	4	8.3%	10.6%
	multi: 48.9%		48		
Knife	focus: 80.9%	21.3%	2	10.0%	12.8%
	multi: 59.6%		20		
Watch	focus: 83.0%	59.6%	4	19.0%	38.3%
	multi: 23.4%		21		
Phone	focus: 100.0%	76.6%	18	52.9%	27.7%
	multi: 23.4%		34		
average:	66.9%	37.7%	12	28.3%	27.0%

Own focus: 85.7%

Own multi: 48.1%

Importance

raw count:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>
Toaster	1	8	4	1	0	11	17	4	1
Coffee	4	5	4	14	1	7	5	7	0
Radio	6	5	5	4	6	5	13	2	1
TV	3	6	11	12	1	6	1	5	2
Hammer	0	6	3	2	2	6	17	10	1
Screwdriver	0	7	2	2	3	14	8	10	1
Printer	0	3	5	0	0	7	24	4	4
Knife	1	4	4	3	2	10	19	4	0
Watch	7	2	4	6	4	3	8	11	2
Phone	1	6	6	7	2	3	14	6	2
Total	23	52	48	51	21	72	126	63	14

470

within-product:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>
Toaster	2.1%	17.0%	8.5%	2.1%	0.0%	23.4%	36.2%	8.5%	2.1%
Coffee	8.5%	10.6%	8.5%	29.8%	2.1%	14.9%	10.6%	14.9%	0.0%
Radio	12.8%	10.6%	10.6%	8.5%	12.8%	10.6%	27.7%	4.3%	2.1%
TV	6.4%	12.8%	23.4%	25.5%	2.1%	12.8%	2.1%	10.6%	4.3%
Hammer	0.0%	12.8%	6.4%	4.3%	4.3%	12.8%	36.2%	21.3%	2.1%
Screwdriver	0.0%	14.9%	4.3%	4.3%	6.4%	29.8%	17.0%	21.3%	2.1%
Printer	0.0%	6.4%	10.6%	0.0%	0.0%	14.9%	51.1%	8.5%	8.5%
Knife	2.1%	8.5%	8.5%	6.4%	4.3%	21.3%	40.4%	8.5%	0.0%
Watch	14.9%	4.3%	8.5%	12.8%	8.5%	6.4%	17.0%	23.4%	4.3%
Phone	2.1%	12.8%	12.8%	14.9%	4.3%	6.4%	29.8%	12.8%	4.3%

within-trait:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>
Toaster	4.3%	15.4%	8.3%	2.0%	0.0%	15.3%	6.3%	7.1%	
Coffee	17.4%	9.6%	8.3%	27.5%	4.8%	9.7%	4.0%	11.1%	0.0%
Radio	26.1%	9.6%	10.4%	7.8%	28.6%	6.9%	10.3%	3.2%	7.1%
TV	13.0%	11.5%	22.9%	23.5%	4.8%	8.3%	0.8%	7.9%	14.3%
Hammer	0.0%	11.5%	6.3%	3.9%	9.5%	8.3%	13.5%	15.9%	7.1%
Screwdriver	0.0%	13.5%	4.2%	3.9%	14.3%	19.4%	6.3%	15.9%	7.1%
Printer	0.0%	5.8%	10.4%	0.0%	0.0%	9.7%	19.0%	6.3%	28.6%
Knife	4.3%	7.7%	8.3%	5.9%	9.5%	13.9%	15.1%	6.3%	0.0%
Watch	30.4%	3.8%	8.3%	11.8%	19.0%	4.2%	6.3%	17.5%	14.3%
Phone	4.3%	11.5%	12.5%	13.7%	9.5%	4.2%	11.1%	9.5%	14.3%
	4.9%	11.1%	10.2%	10.9%	4.5%	15.3%	26.8%	13.4%	3.0%

Combinations

focus/multi:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>	Total
Kitchen	1.2	-2.3	-1.8	-2.0	4.1	0.6	-2.6	4.8	0.1	0.2
Entertainment	1.3	-0.3	-2.0	-1.2	2.1	-3.6	-3.0	2.3	0.0	-0.5
Tools	-0.2	0.0	-0.9	0.1	2.8	-3.2	-1.9	2.3	-0.6	-0.2
Office	1.8	-3.3	-3.5	-1.5	2.0	-5.2	-6.1	2.8	-1.7	-1.6
Personal	0.9	-2.1	-1.2	-1.7	2.6	-2.3	-3.3	4.4	1.2	-0.2
Home	1.2	-1.3	-1.9	-1.6	3.1	-1.5	-2.8	3.5	0.1	-0.1

misc:		Own	Own Dif	Function Parity
Kitchen	focus:	87.2%	37.2%	21.3%
	multi:	50.0%		
Entertainment	focus:	69.1%	27.7%	31.9%
	multi:	41.5%		
Tools	focus:	100.0%	28.7%	37.2%
	multi:	71.3%		
Office	focus:	80.9%	31.9%	10.6%
	multi:	48.9%		
Personal	focus:	87.9%	52.5%	26.2%
	multi:	35.5%		
Home	focus:	78.2%	32.4%	26.6%
	multi:	45.7%		

combo within-product:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>
Kitchen	5.3%	13.8%	8.5%	16.0%	1.1%	19.1%	23.4%	11.7%	1.1%
Entertainment	9.6%	11.7%	17.0%	17.0%	7.4%	11.7%	14.9%	7.4%	3.2%
Tools	0.0%	13.8%	5.3%	4.3%	5.3%	21.3%	26.6%	21.3%	2.1%
Office	0.0%	5.8%	10.4%	0.0%	0.0%	9.7%	19.0%	6.3%	28.6%
Personal	6.4%	8.5%	9.9%	11.3%	5.7%	11.3%	29.1%	14.9%	2.8%
Home	7.4%	12.8%	12.8%	16.5%	4.3%	15.4%	19.1%	9.6%	2.1%

combo within-trait:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>
Kitchen	21.7%	26.5%	18.6%	29.4%	4.8%	27.7%	21.6%	18.6%	10.0%
Entertainment	39.1%	22.4%	37.2%	31.4%	33.3%	16.9%	13.7%	11.9%	30.0%
Tools	0.0%	26.5%	11.6%	7.8%	23.8%	30.8%	24.5%	33.9%	20.0%
Office	39.1%	24.5%	32.6%	31.4%	38.1%	24.6%	40.2%	35.6%	40.0%
Personal	39.1%	24.5%	32.6%	31.4%	38.1%	24.6%	40.2%	35.6%	40.0%
Home	0.2%	0.3%	0.3%	0.4%	0.1%	0.3%	0.4%	0.2%	0.0%

(This chart attempts to collect the focus/multi rating of only the traits circled as most important)

focus/multi:	<i>Attractive</i>	<i>Perceived Quality</i>	<i>Value</i>	<i>Enjoy</i>	<i>Intuitive</i>	<i>Convenient</i>	<i>Useful</i>	<i>Easy to use</i>	<i>Would purchase</i>	average
Toaster	10.0	0.6	-1.3	10.0	#DIV/0!	-2.7	-3.8	8.8	0.0	#DIV/0!
Coffee	0.0	-3.0	-3.8	-5.4	5.0	0.7	-1.0	5.0	#DIV/0!	#DIV/0!
Radio	1.7	1.0	-2.0	3.8	1.7	-5.0	-2.3	7.5	0.0	0.7
TV	3.3	3.3	-2.7	-0.8	5.0	-7.5	-5.0	1.0	10.0	0.7
Hammer	#DIV/0!	5.0	1.7	-5.0	10.0	-6.7	-2.1	3.0	10.0	#DIV/0!
Screwdriver	#DIV/0!	5.0	-2.5	7.5	8.3	-3.2	-5.0	1.0	-5.0	#DIV/0!
Printer	#DIV/0!	-1.7	0.0	#DIV/0!	#DIV/0!	-4.3	-6.3	2.5	-2.5	#DIV/0!
Knife	-5.0	2.5	-1.3	-3.3	5.0	-2.5	-5.5	5.0	#DIV/0!	#DIV/0!
Watch	5.0	2.5	0.0	-0.8	7.5	6.7	-0.6	5.5	10.0	4.0
Phone	-5.0	-5.8	1.7	-5.7	5.0	-1.7	-4.6	4.2	-7.5	-2.2
Average	#DIV/0!	0.9	-1.0	#DIV/0!	#DIV/0!	-2.6	-3.6	4.3	#DIV/0!	

1														
Sex: 1														
Age: 58														
Profession: Aircraft Maintenance Manager														
	Perceived							Easy to	Would		Same			
	Attractive	Quality	Value	Enjoy	Intuitive	Convenient	Useful	use	purchase	Total	Own	Func	Function	
Toaster	2	0	0	0	2	1	-2	2	0	0.56	focus: multi: 1	1	0	toasting cooking
Coffee	0	0	-1	-1	2	1	-1	1	2	0.33	focus: multi: 1	1	0	Coffee Maker Cappuccino / coffee
Radio	1	0	0	2	2	-1	-2	2	2	0.67	focus: multi: 1	1	0	Radio Multi-function radio/alarm/recorder/etc.
TV	0	0	-1	-2	1	-2	-2	2	1	-0.33	focus: multi: 1	1	0	TV DVD/CD TV Combo
Hammer	0	0	0	2	2	-2	-2	1	0	0.11	focus: multi: 1	1	0	driving nails multi-function tool kit
Screwdriver	0	0	-1	-1	1	-2	-2	0	-2	-0.78	focus: multi: 1	1	0	Installing & uninstalling screws Installing & uninstalling various fasteners
Printer	1	0	1	1	1	-2	-2	2	-2	0.00	focus: multi: 1	1	0	Printer Multi-function printer / copier / fax
Knife	0	0	0	-1	0	-2	-2	2	2	-0.11	focus: multi: 1	0	0	Cutting Pocket toolbox
Watch	0	0	-2	-1	1	-2	-2	2	0	-0.44	focus: multi: 1	1	0	Standard watch Calc watch
Phone	0	0	0	-1	1	-1	-1	2	1	0.11	focus: multi: 1	0	0	Telephone Multi-function gizmo
Total	0.40	0.00	-0.40	-0.20	1.30	-1.20	-1.80	1.60	0.40		18	0		
2														
Sex: 1														
Age: 25														
Profession: Rocket Scientist														
	Perceived							Easy to	Would		Same			
	Attractive	Quality	Value	Enjoy	Intuitive	Convenient	Useful	use	purchase	Total	Own	Func	Function	
Toaster	2	0	2	1	2	1	0	1	2	1.22	focus: multi: 0	1	0	Toasting Reheating
Coffee	-1	-1	0	-1	2	0	-1	1	1	0.00	focus: multi: 0	1	1	Brewing coffee Brewing coffee
Radio	2	0	1	1	2	1	0	1	1	1.00	focus: multi: 1	0	0	Playing music rousing one from sleep
TV	2	0	1	0	1	-1	-1	0	2	0.44	focus: multi: 1	0	1	Viewing Viewing
Hammer	-1	-1	1	1	1	0	1	1	1	0.44	focus: multi: 1	0	0	Driving nails Punching, Driving
Screwdriver	0	1	-1	2	1	-1	0	1	2	0.56	focus: multi: 1	1	1	Driving screws Driving screws
Printer	0	0	1	0	1	-1	-1	1	1	0.22	focus: multi: 1	0	0	Printing Copying
Knife	0	0	2	1	1	0	-2	1	2	0.56	focus: multi: 1	1	1	Cutting Cutting
Watch	0	0	1	0	1	-1	-2	1	1	0.11	focus: multi: 1	1	1	Keeping time Keeping time
Phone	-1	-1	1	-1	1	0	0	2	0	0.11	focus: multi: 1	0	1	Communicating Communicating
Total	0.30	-0.20	0.90	0.40	1.30	-0.20	-0.60	1.00	1.30		13	6		
3														
Sex: 1														
Age: 27														
Profession: Healthcare Administration														
	Perceived							Easy to	Would		Same			
	Attractive	Quality	Value	Enjoy	Intuitive	Convenient	Useful	use	purchase	Total	Own	Func	Function	
Toaster	0	0	1	-1	0	0	0	0	0	0.00	focus: multi: 0	1	0	toast cook
Coffee	0	0	1	0	0	-1	0	2	0	0.22	focus: multi: 1	1	0	coffee espresso
Radio	0	0	0	0	0	0	0	0	0	0.00	focus: multi: 0	0	1	radio radio
TV	0	2	-1	0	0	-2	0	0	1	0.00	focus: multi: 1	1	1	display images display images
Hammer	2	1	-1	0	0	0	0	0	2	0.44	focus: multi: 1	0	0	pound shit pound + screw
Screwdriver	1	1	0	0	0	-1	0	-1	-1	-0.11	focus: multi: 1	1	1	drive screws drive screws
Printer	-1	-1	-2	0	0	-2	-2	0	-1	-1.00	focus: multi: 1	1	0	print print/copy/scan
Knife	0	0	-2	-1	1	-2	-2	1	0	-0.56	focus: multi: 1	1	0	cut pocket weight
Watch	2	0	0	0	0	-1	-1	1	2	0.33	focus: multi: 1	0	0	clock clock +
Phone	0	0	-1	0	0	-1	-1	0	0	-0.33	focus: multi: 1	0	0	phone multimedia
Total	0.40	0.30	-0.50	-0.20	0.10	-1.00	-0.60	0.30	0.30		13	3		
4														
Sex: 0														
Age: 25														
Profession: Sales/Marketing														
	Perceived							Easy to	Would		Same			
	Attractive	Quality	Value	Enjoy	Intuitive	Convenient	Useful	use	purchase	Total	Own	Func	Function	
Toaster	1	-1	-1	0	1	-1	-1	1	0	-0.11	focus: multi: 1	1	0	toasting cooking
Coffee	-1	-1	-1	-1	1	1	0	2	0	0.00	focus: multi: 1	1	0	coffee maker coffee maker/espresso maker
Radio	-1	-1	-1	0	0	-1	-1	1	0	-0.44	focus: multi: 1	0	0	amplifier radio alarm
TV	1	-1	-1	0	0	-1	1	-1	1	-0.11	focus: multi: 1	1	0	watching TV TV/ watching movies
Hammer	-1	-1	-1	0	0	-1	-1	-1	-1	-0.78	focus: multi: 1	1	0	driving nails screwing / driving nails
Screwdriver	0	0	-1	0	0	-1	0	1	0	-0.11	focus: multi: 1	1	1	screw driving screw driving
Printer	-1	-1	-1	-1	0	-1	-1	-1	-1	-0.89	focus: multi: 0	0	0	fax printer/fax
Knife	0	-1	-1	0	0	-1	-1	1	1	-0.22	focus: multi: 1	0	0	cutting cutting/multi use
Watch	1	-1	0	1	0	1	-1	1	0	0.22	focus: multi: 1	0	0	time keeping organizing
Phone	-1	-1	-1	-1	0	0	0	1	-1	-0.44	focus: multi: 1	0	1	cell phone cell phone
Total	-0.20	-0.90	-0.90	-0.20	0.20	-0.50	-0.50	0.50	-0.10		15	2		

5												
Sex: 0												
Age: 56												
Profession: FBO Health Project Mgr.												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func Function
Toaster	1	0	-1	-1	2	-1	-1	2	-1	0.00	focus: 1 0 multi: 1 0	toasting toasting/baking
Coffee	0	0	1	1	1	1	1	2	1	0.89	focus: 1 0 multi: 0 0	makes coffee makes espresso & coffee
Radio	0	-1	-1	-1	1	-1	-1	1	-1	-0.44	focus: 1 0 multi: 1 0	radio clock radio/alarm
TV	0	1	-1	-1	1	-1	-1	2	-1	-0.11	focus: 1 0 multi: 0 0	TV TV/VCR/DVD player
Hammer	-1	-1	-1	-1	2	-1	-1	1	-1	-0.44	focus: 1 0 multi: 0 0	pounding & removing nails nailing/ setting & removing screws
Screwdriver	0	0	-1	0	1	-1	0	1	-1	-0.11	focus: 1 1 multi: 0 1	set/remove screws set/remove screws
Printer	1	0	-1	0	2	-1	-1	2	-1	0.11	focus: 1 0 multi: 0 0	printer printer/fax/copier
Knife	0	0	-1	0	0	-1	-1	1	-1	-0.33	focus: 1 0 multi: 0 0	cutting cutting/home improvements/car repairs
Watch	1	1	-1	2	2	-1	-1	2	2	0.78	focus: 0 0 multi: 0 0	tells time tells time/stop watch/calculator/alarm
Phone	1	1	0	1	2	1	1	2	2	1.22	focus: 1 0 multi: 0 0	phone phone/camera/pda
Total	0.30	0.10	-0.70	0.00	1.40	-0.60	-0.50	1.60	-0.20		11	1
6												
Sex: 0												
Age: 28												
Profession: Student												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func Function
Toaster	1	0	-2	-2	1	-1	-2	-1	-1	-0.78	focus: 1 0 multi: 1 1	toast bread bake
Coffee	-1	-1	-1	-1	-1	-1	-1	0	-1	-0.89	focus: 1 1 multi: 1 1	coffee maker coffee maker
Radio	-1	-1	-1	-1	0	-2	-2	0	-1	-1.00	focus: 1 0 multi: 1 0	speaker radio
TV	0	0	-1	0	0	-1	-1	0	0	-0.33	focus: 0 1 multi: 1 1	TV TV
Hammer	0	1	1	0	0	-1	-1	0	0	0.00	focus: 1 1 multi: 1 1	hammer hammer
Screwdriver	0	0	0	0	1	2	0	2	2	0.78	focus: 1 1 multi: 1 1	screw screw
Printer	0	-1	-1	0	0	0	-1	0	0	-0.33	focus: 1 0 multi: 0 0	printing copy
Knife	-1	-1	-1	0	0	0	-1	0	0	-0.44	focus: 1 0 multi: 1 0	knife tool box
Watch	0	0	0	0	0	0	0	0	0	0.00	focus: 1 1 multi: 0 1	watch watch
Phone	-1	-2	0	-1	-1	0	0	0	-1	-0.67	focus: 1 1 multi: 0 1	calling calling
Total	-0.30	-0.50	-0.60	-0.50	0.00	-0.40	-0.90	0.10	-0.20		16	6
7												
Sex: 0												
Age: 21												
Profession: student												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func Function
Toaster	2	-1	-1	0	0	1	-1	1	1	0.22	focus: 1 0 multi: 1 1	cooking toasting
Coffee	1	-1	1	-1	0	-1	-1	1	1	0.00	focus: 1 0 multi: 0 0	make coffee make espresso & coffee
Radio	1	1	0	1	0	-2	1	0	0	0.22	focus: 0 0 multi: 0 0	playing loud music playing portable music
TV	2	1	1	0	0	-1	-1	2	1	0.56	focus: 1 0 multi: 0 0	watching TV watching movies
Hammer	0	0	2	1	1	1	2	1	2	1.11	focus: 1 0 multi: 0 0	hammering making holes
Screwdriver	0	2	1	0	0	1	0	2	1	0.78	focus: 1 1 multi: 0 1	turning screws turning screws
Printer	0	1	2	-1	0	-1	-1	2	1	0.33	focus: 1 0 multi: 0 0	printing copying
Knife	1	1	1	0	0	1	-1	1	1	0.56	focus: 0 0 multi: 0 0	cut string cut, poke, screw anything
Watch	0	-1	1	0	0	1	-1	1	1	0.22	focus: 1 0 multi: 0 0	keep time keep schedule
Phone	-1	-1	1	-1	0	0	1	1	1	0.11	focus: 1 0 multi: 0 0	phone calls messaging
Total	0.60	0.20	0.90	-0.10	0.10	0.00	-0.20	1.20	1.00		9	1
8												
Sex: 0												
Age: 28												
Profession: graphic designer												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func Function
Toaster	2	-1	2	-1	1	2	0	2	-1	0.67	focus: 1 0 multi: 0 0	making toast re-heating
Coffee	-2	-2	2	-2	-1	2	-1	2	-1	-0.33	focus: 1 0 multi: 1 0	makes regular ol' coffee makes fancy coffee and espresso
Radio	-2	-2	0	-2	-2	0	1	0	-2	-1.00	focus: 0 0 multi: 1 0	emergency radio transmission clock radio
TV	2	-2	2	0	2	-2	-2	2	-1	0.11	focus: 1 0 multi: 0 0	television television, VCR, DVD, all in one
Hammer	-2	-1	2	-1	2	2	-2	2	0	0.22	focus: 1 0 multi: 0 0	inserting nails into hard surfaces multi-purpose tool
Screwdriver	-2	-2	2	-2	-2	-2	-2	1	-2	-1.22	focus: 1 0 multi: 0 0	old fashioned screw driver set new-fangled screw driver set
Printer	2	-2	-2	-2	-1	-2	-2	2	-2	-1.00	focus: 1 0 multi: 1 0	printer printer, fax, copier, combo
Knife	2	-2	2	-1	-1	-1	-2	2	-1	-0.22	focus: 1 0 multi: 0 0	plain ol' cuttin' knife knife that does everything
Watch	-2	1	0	1	1	-1	-1	0	2	0.11	focus: 1 0 multi: 0 0	telling time telling time plus nerd-calculator
Phone	-2	-2	2	-2	2	-1	-2	2	-1	-0.44	focus: 1 0 multi: 0 0	cell phone cell phone w/ camera/video
Total	-0.40	-1.50	1.20	-1.20	0.10	-0.30	-1.30	1.50	-0.90		12	0

9													
Sex: 0													
Age: 24													
Profession: graphic designer													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	0	-1	-1	1	-1	-1	0	-1	-0.33	focus: multi: 1	1 0	toast bread heat/re-heat food
Coffee	0	-1	-1	-1	1	-1	-1	0	0	-0.44	focus: multi: 1	1 1	make coffee make coffee
Radio	-1	-1	-1	0	-1	-1	0	0	-1	-0.67	focus: multi: 1	0 1	radio radio
TV	0	0	-1	-1	0	-1	0	0	-1	-0.44	focus: multi: 1	1 1	TV TV
Hammer	1	1	-1	0	0	-1	-1	0	-1	-0.22	focus: multi: 1	1 0	hammer nails multi-use
Screwdriver	0	0	-1	0	0	0	0	0	0	-0.11	focus: multi: 1	1 1	screwdriver screwdriver
Printer	1	-1	-1	-1	1	-1	-1	1	1	-0.11	focus: multi: 1	1 1	printer printer
Knife	0	-1	-2	-2	0	-1	-1	0	-1	-0.89	focus: multi: 0	0 0	to cut multi-purpose
Watch	1	0	-1	-1	0	-1	0	1	1	0.00	focus: multi: 1	1 1	tell time tell time
Phone	-1	0	-1	-1	1	0	-1	0	-1	-0.44	focus: multi: 1	1 1	phone phone
Total	0.20	-0.30	-1.10	-0.80	0.30	-0.80	-0.60	0.20	-0.40		15	7	
10													
Sex: 0													
Age: 31													
Profession: hostess													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	0	2	1	-1	2	0	0	1	0.67	focus: multi: 1	0 0	toasting cooking
Coffee	2	2	2	2	-2	2	2	2	2	1.56	focus: multi: 1	1 1	coffee coffee
Radio	0	-2	0	-2	-1	1	-2	1	0	-0.56	focus: multi: 0	0 1	music music
TV	-2	0	-1	0	0	-2	-1	-2	0	-0.89	focus: multi: 1	0 0	video viewing TV viewing
Hammer	1	2	2	2	0	2	-1	0	0	0.89	focus: multi: 1	1 0	hitting fixing
Screwdriver	2	2	2	2	2	2	2	2	2	2.00	focus: multi: 1	1 1	screwing screwing
Printer	-2	-2	-2	-2	-1	-2	-2	-1	-2	-1.78	focus: multi: 1	1 0	printing multi-printing
Knife	0	0	0	0	0	0	0	0	0	0.00	focus: multi: 1	1 0	cutting working
Watch	2	0	1	1	-1	0	1	2	0	0.67	focus: multi: 1	0 1	time time
Phone	1	0	0	-1	-1	2	1	0	0	0.22	focus: multi: 1	1 1	calling calling
Total	0.50	0.20	0.60	0.30	-0.50	0.70	0.00	0.40	0.30		15	5	
11													
Sex: 1													
Age: 25													
Profession: Student													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	-2	-2	0	2	1	0	1	1	0.22	focus: multi: 1	1 0	toasting cooking
Coffee	1	-1	-2	-1	2	-1	1	-1	0	-0.22	focus: multi: 1	1 0	make coffee make special coffee
Radio	-1	-1	-1	-1	-2	-1	-1	-1	-1	-1.11	focus: multi: 1	0 0	? radio
TV	1	-1	-2	-2	0	-2	-2	0	-1	-1.00	focus: multi: 1	1 0	TV movies
Hammer	0	-2	-1	0	1	-1	-2	1	0	-0.44	focus: multi: 1	1 0	hammer build
Screwdriver	1	-2	-2	-1	0	-1	-1	0	-1	-0.78	focus: multi: 1	1 1	screw driving screw driving
Printer	1	-1	-2	0	1	0	-2	1	1	-0.11	focus: multi: 1	0 0	print copy
Knife	1	0	-1	-1	1	-1	-2	0	1	-0.22	focus: multi: 1	0 0	cutting anything
Watch	2	-1	-1	-1	0	-1	-1	1	1	-0.11	focus: multi: 1	1 0	time telling time / calculation
Phone	1	-1	-2	-1	1	-1	-1	-2	0	-0.67	focus: multi: 1	0 0	talk record
Total	0.80	-1.20	-1.60	-0.80	0.60	-0.80	-1.10	0.00	0.10		15	1	
12													
Sex: 0													
Age: 22													
Profession: student													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	2	-1	0	2	2	2	0	2	2	1.22	focus: multi: 1	1 0	toaster toaster oven
Coffee	2	-2	-2	-1	2	0	-2	2	0	-0.11	focus: multi: 0	0 0	coffee coffee plus cappuccino
Radio	2	-2	-1	0	2	0	-2	2	-1	0.00	focus: multi: 0	0 1	radio radio
TV	1	-1	-2	-2	0	-2	-2	2	-2	-0.89	focus: multi: 1	1 0	TV TV / video / DVD
Hammer	1	-2	-2	0	0	-2	-2	-2	0	-1.00	focus: multi: 1	1 0	nailing nailing / screwing
Screwdriver	-1	-2	0	-1	0	-2	0	1	-2	-0.78	focus: multi: 1	1 1	screwdriver screwdriver
Printer	2	-2	-2	0	0	-2	-2	2	0	-0.44	focus: multi: 1	1 0	printer printer / scanner / combo
Knife	-1	-2	-2	-2	1	-2	-2	-1	2	-1.00	focus: multi: 1	0 0	pocket knife multifunctioned pocket knife
Watch	2	-2	0	-2	-2	0	-2	2	2	-0.22	focus: multi: 1	0 0	digital watch watch / calc
Phone	-2	-2	-2	0	2	0	-2	2	0	-0.44	focus: multi: 1	0 0	cell video camera cell
Total	0.80	-1.80	-1.30	-0.60	0.70	-0.80	-1.60	1.20	0.10		12	2	

13														
Sex: 0														
Age: 27														
Profession: Student														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	-1	-2	0	1	0	-1	2	-2	-0.22	focus: multi: 1	1	0	toast cook
Coffee	1	-1	2	0	1	1	-1	2	0	0.56	focus: multi: 0	0	0	making coffee making gourmet coffee
Radio	-1	1	-1	1	1	-1	1	1	1	0.33	focus: multi: 0	0	0	playing audio playing radio broadcasts
TV	1	1	-1	1	0	-1	-1	0	2	0.22	focus: multi: 1	1	0	watching anything watching dvd or vhs
Hammer	1	1	0	1	0	-1	0	0	0	0.22	focus: multi: 1	1	0	nailing fixing
Screwdriver	1	2	1	2	0	-1	1	2	1	1.00	focus: multi: 1	1	1	screwing screwing
Printer	1	1	-1	0	0	-2	-2	1	-2	-0.44	focus: multi: 0	1	0	print from file print from hardcopy or file
Knife	2	2	0	1	2	0	0	2	2	1.22	focus: multi: 1	1	0	slicing preparing
Watch	2	0	1	2	0	-1	-1	1	1	0.56	focus: multi: 1	1	1	time telling time telling
Phone	1	1	0	2	0	2	2	1	2	1.22	focus: multi: 1	0	0	call play
Total	1.00	0.70	-0.10	1.00	0.50	-0.40	-0.20	1.20	0.50		13	2		
14														
Sex: 0														
Age: 24														
Profession: traffic manager														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	-1	-1	1	1	1	0	1	2	0.56	focus: multi: 1	1	0	toast warm
Coffee	-1	-1	0	-1	0	0	0	1	1	-0.11	focus: multi: 1	0	0	coffee maker coffee espresso maker
Radio	-1	-2	-1	0	-1	-1	-1	1	-2	-0.89	focus: multi: 0	0	0	radio alarm & radio
TV	0	-1	-1	-1	0	-1	-1	1	-2	-0.67	focus: multi: 1	1	0	watch TV watch TV & movies
Hammer	0	-2	-1	0	0	-2	-1	1	-1	-0.67	focus: multi: 1	1	0	hammer nails all-in-one tool
Screwdriver	0	-1	-1	0	-1	-2	-1	-2	-1	-1.00	focus: multi: 1	0	0	screw power screw
Printer	0	-1	-1	0	0	-1	-1	1	-1	-0.44	focus: multi: 1	0	0	printing printing & faxing
Knife	0	-1	-1	-1	1	-2	-1	0	0	-0.56	focus: multi: 0	0	0	blade-only swiss army knife swiss army knife
Watch	1	-1	-1	0	0	-1	0	1	0	-0.11	focus: multi: 1	0	0	watch calculator watch
Phone	-1	-1	0	-1	-1	0	-1	1	-1	-0.56	focus: multi: 1	0	0	phone camera, web & phone
Total	-0.10	-1.20	-0.80	-0.30	-0.10	-0.90	-0.70	0.60	-0.50		12	0		
15														
Sex: 1														
Age: 56														
Profession: Free-lance writer														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	0	0	-1	0	-1	-1	0	0	0	-0.33	focus: multi: 1	1	0	toasting cooking
Coffee	0	0	0	1	1	1	1	2	1	0.78	focus: multi: 1	0	0	coffee maker cappuccino / coffee
Radio	-1	-1	-1	-1	1	-2	-2	0	-1	-0.89	focus: multi: 1	1	0	radio clock / radio
TV	0	-1	-1	-2	1	-2	-1	0	-2	-0.89	focus: multi: 1	1	1	entertainment entertainment
Hammer	1	-1	0	1	1	-1	0	0	0	0.11	focus: multi: 1	0	1	driving driving
Screwdriver	-1	0	0	0	1	-1	0	0	0	-0.11	focus: multi: 1	1	1	driving driving
Printer	-1	-1	-1	-1	1	-2	-2	0	-1	-0.89	focus: multi: 0	0	0	copier copier / fax / printing
Knife	1	-1	-1	-1	0	-1	-1	1	-1	-0.44	focus: multi: 1	1	0	knife multiple
Watch	1	-1	0	0	1	0	0	2	0	0.33	focus: multi: 1	0	0	time / communication
Phone	0	0	-1	0	1	0	0	1	1	0.22	focus: multi: 1	0	0	communication communication / recording
Total	0.00	-0.60	-0.60	-0.30	0.70	-0.90	-0.50	0.60	-0.30		15	3		
16														
Sex: 0														
Age: 49														
Profession: marketing director														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	0	0	0	0	0	0	0	0	0	0.00	focus: multi: 1	1	0	toasting cooking
Coffee	0	-1	-1	-1	1	1	1	1	1	0.22	focus: multi: 1	1	0	coffee maker coffee / cappuccino maker
Radio	0	0	-1	0	0	0	-1	0	0	-0.22	focus: multi: 0	0	0	radio radio w/clock
TV	0	0	-2	-2	0	-1	-1	1	-1	-0.67	focus: multi: 1	1	0	TV / VCR / DVD
Hammer	0	0	-2	0	0	0	0	0	1	-0.11	focus: multi: 1	1	0	pounding fixing
Screwdriver	0	-1	-1	-1	1	1	0	1	0	0.00	focus: multi: 1	1	0	manual screwdriver electric screwdriver
Printer	0	-2	-2	0	0	-1	-1	-1	-1	-0.89	focus: multi: 0	1	0	copier fax / copier
Knife	0	-2	-2	0	0	0	0	0	0	-0.44	focus: multi: 1	1	0	knife blade tool kit
Watch	0	-1	-1	-1	0	-1	-1	0	0	-0.56	focus: multi: 0	0	0	digital watch digital watch / calculator
Phone	0	0	-1	0	1	1	-1	1	1	0.22	focus: multi: 1	0	0	cell phone cell phone / camera
Total	0.00	-0.70	-1.30	-0.50	0.30	0.00	-0.40	0.30	0.10		14	0		

17													
Sex: 0													
Age: 21													
Profession: Student													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	0	1	2	-1	1	-2	0	1	0	0.22	focus: multi: 1	1 0	toasting cooking
Coffee	1	-1	-1	0	0	1	1	1	0	0.22	focus: multi: 0	1 0	coffee frappachino coffee
Radio	-1	-1	0	-1	0	-1	0	-2	-1	-0.78	focus: multi: 1	1 0	speaker radio
TV	0	-2	-1	-1	-1	-1	-1	-1	0	-0.89	focus: multi: 1	1 0	watching recording
Hammer	0	-2	-2	0	0	-1	-2	-1	-2	-1.11	focus: multi: 1	1 0	hammering tools
Screwdriver	-1	1	0	0	-1	-2	0	0	0	-0.33	focus: multi: 1	1 1	screwing screwing
Printer	0	-1	-1	0	0	-2	0	0	0	-0.44	focus: multi: 1	0 0	printer fax
Knife	0	-1	-1	0	-1	-1	-2	0	-1	-0.78	focus: multi: 1	1 0	knife everything
Watch	2	0	1	2	-1	2	1	2	2	1.22	focus: multi: 1	1 0	watch calculator
Phone	2	-1	0	0	-2	1	2	2	1	0.56	focus: multi: 1	0 0	calling video
Total	0.30	-0.70	-0.30	-0.10	-0.50	-0.60	-0.10	0.20	-0.10		16	1	
18													
Sex: 0													
Age: 20													
Profession: student													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	-1	1	0	-2	2	2	0	2	-1	0.33	focus: multi: 0	1 0	toasting cooking
Coffee	-1	-2	-2	-2	-1	-1	-2	-2	-2	-1.67	focus: multi: 0	0 0	making coffee making espresso / coffee
Radio	-1	-1	-1	-1	2	2	2	2	2	0.67	focus: multi: 0	1 0	listening waking up
TV	-1	2	0	0	2	2	2	2	0	1.00	focus: multi: 0	1 0	watching TV playing DVDs
Hammer	0	-2	-2	-2	-2	-2	-2	-2	-2	-1.78	focus: multi: 1	1 0	hammering screwing
Screwdriver	0	-2	-2	-2	-2	-2	-2	-2	-2	-1.78	focus: multi: 1	1 0	unscrewing changing out bits + unscrewing
Printer	0	-1	-2	-2	-2	-2	-2	-2	-2	-1.67	focus: multi: 1	1 0	printing faxing
Knife	0	0	0	1	2	2	2	2	2	1.22	focus: multi: 0	0 0	cut stuff to save MacGyver
Watch	2	2	2	1	2	0	0	2	2	1.44	focus: multi: 0	0 0	time calculating / time
Phone	-1	-1	1	1	-2	-2	-2	-2	-2	-1.11	focus: multi: 1	0 0	calling internet surfing
Total	-0.30	-0.40	-0.60	-0.80	0.10	-0.10	-0.40	0.00	-0.50		12	0	
19													
Sex: 1													
Age: 39													
Profession: Sales Manager													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	1	-1	1	0	1	-1	1	1	0.44	focus: multi: 0	1 1	Toast Toast
Coffee	-1	0	-1	-1	-1	0	0	0	0	-0.44	focus: multi: 0	1 1	make coffee make coffee
Radio	1	0	0	0	0	0	0	0	0	0.11	focus: multi: 0	0 0	play audio record audio
TV	1	1	1	1	0	-1	-1	0	1	0.33	focus: multi: 0	1 0	watch TV view multimedia
Hammer	1	1	-1	0	0	0	0	0	0	0.11	focus: multi: 1	1 0	Drive Nails Assemble Items
Screwdriver	-1	1	0	0	0	-1	-1	0	-1	-0.33	focus: multi: 1	1 1	turn screws turn screws
Printer	1	0	-1	0	0	-1	-1	0	0	-0.22	focus: multi: 1	1 0	color print fax
Knife	1	0	-1	-1	0	-1	-1	0	-1	-0.44	focus: multi: 1	1 0	cut multifunction
Watch	0	0	0	0	0	0	-1	0	0	-0.11	focus: multi: 1	1 1	tell time tell time
Phone	-1	-1	-1	-1	-1	-1	-1	0	-1	-0.89	focus: multi: 1	0 0	communication multimedia
Total	0.30	0.30	-0.50	-0.10	-0.20	-0.40	-0.70	0.10	-0.10		14	4	
20													
Sex: 1													
Age: 35													
Profession: Designer													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	0	0	-1	-1	0	-1	-1	1	0	-0.33	focus: multi: 1	1 0	cook bake
Coffee	-1	-1	1	1	1	-1	-1	0	-1	-0.22	focus: multi: 0	1 0	brew coffee brew coffee & espresso
Radio	-1	-1	0	0	1	0	0	-1	-1	-0.33	focus: multi: 0	0 1	listening listening
TV	1	1	-1	1	1	-1	-1	1	1	0.33	focus: multi: 0	1 0	watch watch several formats
Hammer	0	1	-1	0	2	-1	1	1	1	0.44	focus: multi: 1	1 0	beat multi-task
Screwdriver	0	1	-1	1	1	1	1	0	1	0.56	focus: multi: 1	1 1	screw screw
Printer	-1	-1	-1	0	1	-1	-1	0	-1	-0.56	focus: multi: 0	0 0	fax copy
Knife	1	0	-1	-1	0	-1	1	1	1	0.11	focus: multi: 1	1 0	cut organize
Watch	1	0	1	1	1	1	-1	1	1	0.67	focus: multi: 0	1 0	tell time organize
Phone	-1	-1	1	-1	1	1	-1	1	-1	-0.11	focus: multi: 1	1 1	communicate communicate
Total	-0.10	-0.10	-0.30	0.10	0.90	-0.30	-0.30	0.50	0.10		14	3	

21														
Sex: 1														
Age: 25														
Profession: Software Engineer														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	0	-1	-1	2	0	-1	1	0	0.11	focus: multi: 1	1	0	toasting
Coffee	0	0	-1	0	2	-1	0	1	0	0.11	focus: multi: 1	0	0	baking
Radio	0	-1	-1	-1	0	-1	0	0	0	-0.44	focus: multi: 1	0	0	coffee maker
TV	0	0	-1	-1	1	-2	-1	1	-1	-0.44	focus: multi: 1	0	0	espresso maker
Hammer	-1	-1	0	-1	1	-2	-1	0	-1	-0.67	focus: multi: 1	0	0	radio
Screwdriver	0	0	0	0	1	-2	-1	0	0	-0.22	focus: multi: 1	1	1	digital radio
Printer	1	0	0	0	1	-2	-1	1	0	0.00	focus: multi: 1	0	0	watching TV
Knife	0	0	-1	-1	2	-2	-1	0	-1	-0.44	focus: multi: 1	0	0	watching dvd + VHS movies
Watch	1	0	-1	1	2	-1	1	2	1	0.67	focus: multi: 1	0	1	hammering
Phone	-1	0	-1	-1	1	-2	-1	1	-1	-0.56	focus: multi: 1	0	0	building
Total	0.10	-0.20	-0.70	-0.50	1.30	-1.50	-0.60	0.70	-0.30		15	2		screwdriver
22														
Sex: 1														
Age: 26														
Profession: Student														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	2	1	-1	0	2	0	-1	2	1	0.67	focus: multi: 1	1	0	toasting
Coffee	-1	0	-2	-2	1	-2	-2	2	-2	-0.89	focus: multi: 1	0	1	reheating
Radio	-1	-1	-1	0	-1	0	0	0	0	-0.44	focus: multi: 0	0	1	make coffee
TV	1	0	-2	-1	1	-1	-2	1	-1	-0.44	focus: multi: 0	0	1	make coffee
Hammer	1	-1	-1	1	1	0	0	1	1	0.33	focus: multi: 1	0	0	entertainment
Screwdriver	-1	0	-2	-2	0	-2	-2	1	-2	-1.11	focus: multi: 0	1	1	entertainment
Printer	1	0	-2	-1	1	-2	-2	1	-2	-0.67	focus: multi: 1	0	1	entertainment
Knife	2	0	-2	1	2	-2	0	2	2	0.56	focus: multi: 1	0	0	drives nails
Watch	2	1	0	0	1	2	-1	2	0	0.78	focus: multi: 1	0	1	makes holes
Phone	-1	0	-2	-1	1	-1	-2	1	1	-0.44	focus: multi: 0	1	1	drive screws
Total	0.50	0.00	-1.50	-0.50	0.90	-0.80	-1.20	1.30	-0.20		11	7		drive screws
23														
Sex: 0														
Age: 24														
Profession: ID Graduate Student														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	2	1	-1	0	2	1	0	2	1	0.89	focus: multi: 1	1	0	toasting
Coffee	1	-1	-2	-1	2	0	0	1	1	0.11	focus: multi: 1	0	0	cooking w/a crunch
Radio	2	1	0	0	1	-1	0	1	0	0.44	focus: multi: 0	0	1	coffee making
TV	1	1	-1	-1	2	-1	0	2	1	0.44	focus: multi: 0	0	0	cappuccino making
Hammer	-1	-1	-2	0	2	1	-1	2	1	0.11	focus: multi: 1	0	0	radio
Screwdriver	0	1	0	0	1	-1	0	1	1	0.33	focus: multi: 1	0	0	radio
Printer	2	0	-1	1	2	-1	-1	2	1	0.56	focus: multi: 1	0	0	watching TV
Knife	1	0	-1	0	1	-1	1	2	1	0.44	focus: multi: 1	0	0	entertainment
Watch	2	2	0	1	2	2	2	2	2	1.67	focus: multi: 1	0	0	hammering
Phone	-1	-1	-1	-1	1	-1	0	1	-1	-0.44	focus: multi: 0	0	0	fixing stuff
Total	0.90	0.30	-0.90	-0.10	1.60	-0.20	0.10	1.60	0.80		12	1		home repair
24														
Sex: 0														
Age: 21														
Profession: Student														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	0	-1	-1	0	0	-1	0	-1	-0.33	focus: multi: 1	1	1	toasting
Coffee	-1	-2	-2	0	0	0	0	0	0	-0.56	focus: multi: 0	0	1	toasting
Radio	2	2	2	1	0	0	0	0	2	1.00	focus: multi: 0	0	1	coffee
TV	2	1	1	1	0	0	0	0	2	0.78	focus: multi: 1	1	1	coffee
Hammer	-1	0	0	-1	0	-1	-2	0	-2	-0.78	focus: multi: 1	0	0	radio
Screwdriver	1	0	0	0	0	0	0	0	0	0.11	focus: multi: 1	1	1	wasting time
Printer	2	-1	-1	1	1	1	0	1	1	0.56	focus: multi: 1	0	0	wasting time
Knife	-2	-1	-1	-2	0	0	-2	0	-1	-1.00	focus: multi: 1	0	0	hammering
Watch	-2	-2	-2	-2	-1	-1	-2	-1	-2	-1.67	focus: multi: 1	1	1	hammering + screwing
Phone	-2	-2	-2	-1	1	-1	-2	0	-1	-1.11	focus: multi: 1	1	1	screws
Total	0.00	-0.50	-0.60	-0.40	0.10	-0.20	-0.90	0.00	-0.20		14	7		screws

25													
Sex: 1													
Age: 23													
Profession: Government flunkie / CS major													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	-1	-1	-1	-1	1	-1	-1	1	-1	-0.56	focus: multi: 1	1 0	toast food
Coffee	-1	-1	-1	0	1	-1	-1	1	0	-0.33	focus: multi: 0	0 1	coffee coffee
Radio	1	1	0	0	0	0	-1	1	0	0.22	focus: multi: 1	0	radio play sound
TV	1	1	-1	-1	1	-1	-1	1	0	0.00	focus: multi: 1	0	TV video
Hammer	-1	-1	-1	0	0	-1	-1	0	-1	-0.67	focus: multi: 1	0	hammer screw
Screwdriver	-1	-1	-1	0	2	-1	0	1	-1	-0.22	focus: multi: 0	1	screwing screwing
Printer	1	-1	-1	1	1	-1	-1	1	1	0.11	focus: multi: 0	0	printer fax
Knife	-1	-2	-1	-1	2	-2	-2	2	-1	-0.67	focus: multi: 1	1	knife knife
Watch	-1	-1	0	-1	1	-1	-1	1	-1	-0.44	focus: multi: 1	0	watch calculator watch
Phone	-1	-2	-1	-1	1	-1	-1	1	0	-0.56	focus: multi: 0	0	phone procrastination
Total	-0.40	-0.80	-0.80	-0.40	1.00	-1.00	-1.00	1.00	-0.40		15	3	
26													
Sex: 1													
Age: 23													
Profession: Designer / Bum													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	-1	1	-1	2	-1	-1	1	0	0.11	focus: multi: 0	1 0	toasting bread toasting bagels
Coffee	0	-1	0	-1	0	1	0	0	0	-0.11	focus: multi: 0	0	bad coffee depth charge maker
Radio	0	1	0	-1	-1	-1	-1	-1	-1	-0.56	focus: multi: 0	0	portable speaker portable all in one radio
TV	0	0	-1	0	0	-1	-1	1	0	-0.22	focus: multi: 0	0	watch TV all in one vcr TV
Hammer	1	2	1	0	2	0	0	0	1	0.78	focus: multi: 1	0	driving nails gift to crappy relative
Screwdriver	1	1	0	1	2	0	0	1	1	0.78	focus: multi: 1	1	driving screws driving screws
Printer	0	-1	-1	-1	0	-2	-2	0	-1	-0.89	focus: multi: 1	0	printing copying / printer
Knife	0	-1	0	0	1	-1	0	1	0	0.00	focus: multi: 1	0	whittling looking like a jerk in 3rd grade
Watch	1	0	1	-1	0	0	0	1	0	0.22	focus: multi: 0	0	time telling watch calculator
Phone	1	-1	1	0	1	0	0	0	1	0.33	focus: multi: 0	0	phone calls creating phone jerks
Total	0.50	-0.10	0.20	-0.40	0.70	-0.50	-0.50	0.40	0.10		14	1	
27													
Sex: 0													
Age: 33													
Profession: Project manager - software													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	2	2	0	1	2	1	0	2	2	1.33	focus: multi: 1	1 0	toast bake
Coffee	0	0	-1	0	1	-1	0	0	1	0.00	focus: multi: 0	0	coffee coffee drinks
Radio	0	0	0	0	1	0	0	0	0	0.11	focus: multi: 0	0	speaker radio
TV	0	0	-1	0	1	-1	0	0	0	-0.11	focus: multi: 1	0	viewing playing
Hammer	1	2	1	0	0	-2	0	0	0	0.22	focus: multi: 1	0	hammer tool
Screwdriver	1	2	2	1	2	0	0	2	1	1.22	focus: multi: 0	0	screwdriver set
Printer	-1	-2	-1	0	0	-2	-1	-1	-2	-1.11	focus: multi: 1	0	printer multifunction
Knife	2	1	-1	0	1	-2	0	0	1	0.22	focus: multi: 1	0	knife tools
Watch	1	1	1	0	2	0	0	0	0	0.56	focus: multi: 0	0	time calculate
Phone	0	0	-1	-2	1	0	-1	2	0	-0.11	focus: multi: 0	0	phone communication
Total	0.60	0.60	-0.10	0.00	1.10	-0.70	-0.20	0.50	0.30		15	0	
28													
Sex: 1													
Age: 34													
Profession: Web Developer													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	1	0	0	2	2	-1	2	0	0.78	focus: multi: 1	1 0	Simple toasting Complex toasting
Coffee	-1	-1	0	-1	0	2	0	2	0	0.11	focus: multi: 0	0	Make coffee Make assorted caffeine products
Radio	0	0	0	1	1	0	-1	1	0	0.22	focus: multi: 1	0	Radio Alarm clock
TV	1	1	0	0	1	-1	0	0	1	0.33	focus: multi: 1	0	Watch TV Watch tapes & TV
Hammer	1	2	2	0	2	-1	1	2	0	1.00	focus: multi: 1	0	Hammer nail Substitute when I don't have a real hammer
Screwdriver	0	1	0	0	1	-1	0	2	1	0.44	focus: multi: 1	0	Screw things Screw things when I only have one pocket
Printer	1	1	0	0	1	-1	-1	0	1	0.22	focus: multi: 1	0	Printing Printing but other stuff to sell me
Knife	1	-1	-1	-1	0	-1	-1	2	0	-0.22	focus: multi: 1	1	Cutting Cutting
Watch	1	1	1	1	1	1	1	1	2	1.11	focus: multi: 1	0	Tell time Tell time with useless other features
Phone	0	-1	-1	-1	1	1	0	1	-1	-0.11	focus: multi: 0	1	Phone Phone
Total	0.50	0.40	0.10	-0.10	1.00	0.10	-0.20	1.30	0.40		18	2	

29													
Sex: 0													
Age: 21													
Profession: Student													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	2	0	-1	1	2	2	0	1	0	0.78	focus: multi: 1	1	Toasting
Coffee	-1	-1	-2	-2	1	0	0	1	-2	-0.67	focus: multi: 1	0	Make coffee
Radio	1	1	0	0	1	-1	0	1	1	0.44	focus: multi: 0	1	Make espresso
TV	1	0	-1	0	2	-2	-1	1	0	0.00	focus: multi: 0	1	Play music
Hammer	-1	0	-1	0	1	-2	0	1	0	-0.22	focus: multi: 1	0	Play music
Screwdriver	0	-1	0	0	2	-1	0	1	0	0.11	focus: multi: 1	0	Plays TV
Printer	0	-1	-1	0	0	-1	-2	1	-1	-0.56	focus: multi: 1	0	Plays TV & movies
Knife	1	-1	-1	0	0	-1	-1	1	0	-0.22	focus: multi: 1	0	To hammer
Watch	1	0	0	0	2	0	0	2	0	0.56	focus: multi: 0	0	Hit & screw
Phone	0	-1	-1	-2	2	0	0	1	0	-0.11	focus: multi: 1	0	To screw
Total	0.40	-0.40	-0.80	-0.30	1.30	-0.60	-0.40	1.10	-0.20		11	3	To screw a lot
30													
Sex: 1													
Age: 23													
Profession: Programmer													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	0	-2	1	0	1	2	-1	1	-1	0.11	focus: multi: 1	1	Toast slices of bread
Coffee	-2	-2	1	-2	2	-1	-2	1	-1	-0.67	focus: multi: 1	0	Toast lots of stuff
Radio	1	0	0	0	0	-2	1	-1	1	0.00	focus: multi: 1	0	Brew & make coffee
TV	1	0	0	-1	-1	-1	-1	0	2	-0.11	focus: multi: 1	0	Coffee & espresso & steam
Hammer	0	0	0	0	1	0	0	0	0	0.11	focus: multi: 1	0	Amplify sound
Screwdriver	0	-1	-1	1	1	-2	0	0	0	-0.22	focus: multi: 1	1	Play the radio
Printer	2	0	-1	-1	0	-2	-1	0	0	-0.33	focus: multi: 1	0	Watch TV
Knife	-1	-1	1	-2	0	-2	-2	0	-2	-1.00	focus: multi: 1	1	Watch movies
Watch	0	-1	1	-1	1	-1	0	2	0	0.11	focus: multi: 0	0	Hammer / hit stuff
Phone	1	1	2	0	2	0	0	2	1	1.00	focus: multi: 1	0	Screw & hit stuff
Total	0.20	-0.60	0.40	-0.60	0.70	-0.90	-0.60	0.50	0.00		18	2	Screwing
31													
Sex: 0													
Age: 21													
Profession: Student													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	0	-1	0	2	-2	-1	0	-1	-0.22	focus: multi: 1	1	Toaster
Coffee	0	-2	-2	-2	2	-1	-1	0	-1	-0.78	focus: multi: 1	0	Complex toaster-oven
Radio	0	1	0	-1	1	0	0	1	0	0.22	focus: multi: 0	0	Filter coffee
TV	0	1	-1	0	0	-1	-1	1	1	0.00	focus: multi: 0	0	Coffee / espresso creator
Hammer	1	1	0	0	2	2	2	2	1	1.22	focus: multi: 0	1	Speakers?
Screwdriver	0	0	-2	-1	0	-1	-2	-1	-2	-1.00	focus: multi: 1	1	Radio?
Printer	2	1	0	1	2	2	0	2	2	1.33	focus: multi: 1	0	Television
Knife	1	0	-1	0	0	0	0	0	0	0.00	focus: multi: 0	0	Video viewing device
Watch	0	0	0	1	2	0	1	2	2	0.89	focus: multi: 1	0	To hammer
Phone	-1	0	-1	0	1	0	0	1	0	0.00	focus: multi: 0	0	To hammer
Total	0.40	0.20	-0.80	-0.20	1.20	-0.10	-0.20	0.80	0.20		11	2	Screw
32													
Sex: 0													
Age: 21													
Profession: Student													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	-1	-1	-2	-2	-1	2	-2	1	0	-0.67	focus: multi: 1	1	Toast bread
Coffee	-2	-2	-2	0	1	2	-2	2	0	-0.33	focus: multi: 0	1	Toast / bake
Radio	-2	-2	-2	0	0	-2	-2	2	-2	-1.11	focus: multi: 0	1	Making coffee
TV	2	-2	-2	0	1	-2	-2	2	2	-0.11	focus: multi: 0	1	Making coffee
Hammer	-2	-2	-2	0	-1	-2	-2	2	-2	-1.22	focus: multi: 1	0	Entertainment
Screwdriver	-2	-2	-2	0	-1	-2	0	2	-2	-1.00	focus: multi: 1	0	Entertainment
Printer	-2	-2	-2	0	-2	2	-2	2	-2	-0.89	focus: multi: 0	1	Hammer
Knife	-2	-2	-2	0	-1	-2	-2	2	0	-1.00	focus: multi: 0	0	Hammer / screw
Watch	2	-2	-2	0	-1	-2	-2	2	2	-0.33	focus: multi: 1	1	Screw manually
Phone	-2	-2	-2	-2	-2	-2	-2	2	-2	-1.56	focus: multi: 1	1	Screw electric
Total	-1.10	-1.90	-2.00	-0.40	-0.70	-0.80	-1.80	1.90	-0.60		11	6	Print

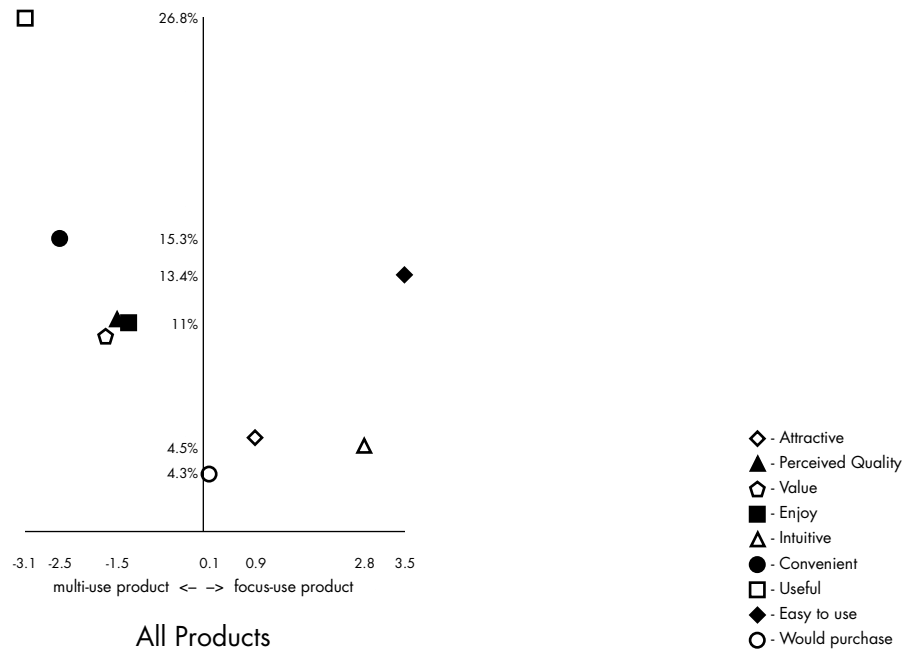
33														
Sex: 1														
Age: 30														
Profession: Mktg Research														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	1	0	-1	1	0	-1	1	0	0.22	focus: multi: 1	1	0	Toasting
Coffee	1	0	-1	-1	0	-1	-1	0	-1	-0.44	focus: multi: 0	0	0	Cooking
Radio	1	0	-1	0	1	-1	-1	0	-1	-0.22	focus: multi: 0	0	1	Coffee maker
TV	1	1	-1	-1	1	-1	-1	1	1	0.11	focus: multi: 0	0	1	Espresso / Coffee
Hammer	1	-1	-1	-1	1	0	-1	0	-1	-0.33	focus: multi: 1	1	0	Music listening
Screwdriver	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1.00	focus: multi: 1	1	1	Music listening
Printer	1	0	-1	-1	1	-1	-1	0	-1	-0.33	focus: multi: 0	0	0	TV viewing/recording
Knife	0	0	-1	-1	1	-1	-1	0	-1	-0.44	focus: multi: 1	1	0	Hammering
Watch	1	1	0	1	1	0	-1	0	1	0.44	focus: multi: 1	1	1	Fastening
Phone	-1	-1	-1	-1	1	-1	-1	0	-1	-0.67	focus: multi: 1	1	0	Fastening
Total	0.50	0.00	-0.80	-0.70	0.70	-0.70	-1.00	0.10	-0.50		13	3		
34														
Sex: 1														
Age: 27														
Profession: Student / Writer														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	0	2	-2	2	1	-2	1	-1	0.22	focus: multi: 1	1	0	Toast
Coffee	0	-1	1	-1	0	0	0	1	-1	-0.11	focus: multi: 1	1	0	Melt
Radio	0	0	1	0	0	0	-1	0	1	0.11	focus: multi: 1	0	0	Coffee
TV	1	0	2	0	2	1	-1	0	-1	0.44	focus: multi: 0	0	0	Espresso
Hammer	0	0	2	-1	0	-1	-1	0	-1	-0.22	focus: multi: 1	1	0	Portable volume
Screwdriver	-1	1	1	-1	0	-1	0	0	-2	-0.33	focus: multi: 1	1	0	Portable music choice
Printer	2	-1	2	-1	2	-2	-2	0	-1	-0.11	focus: multi: 1	1	0	TV watching
Knife	1	0	2	-1	0	-1	-1	0	0	0.00	focus: multi: 1	0	0	Movie watching
Watch	0	0	1	0	0	0	-1	1	2	0.33	focus: multi: 1	1	0	Nailing
Phone	0	-1	2	-1	0	-1	-2	1	0	-0.22	focus: multi: 1	1	0	Repair
Total	0.40	-0.20	1.60	-0.80	0.60	-0.40	-1.10	0.40	-0.40		16	0		
35														
Sex: 0														
Age: 27														
Profession: Social Worker														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	2	-1	0	-1	1	-1	-1	0	-1	-0.22	focus: multi: 1	1	1	Toasting
Coffee	-1	-1	0	-1	1	-1	-1	1	-1	-0.44	focus: multi: 1	1	0	Toasting
Radio	-1	1	0	-1	1	-1	-1	1	-1	-0.22	focus: multi: 0	1	1	Making coffee
TV	1	0	0	1	1	-1	0	1	1	0.44	focus: multi: 1	1	1	Making espresso
Hammer	-1	1	0	-1	1	-1	-1	1	-1	-0.22	focus: multi: 1	1	0	Playing music
Screwdriver	1	-1	0	1	1	1	0	1	1	0.56	focus: multi: 1	0	1	Playing music
Printer	1	-1	0	-1	-1	-1	-1	1	0	-0.33	focus: multi: 0	0	0	Entertaining
Knife	1	0	0	-1	1	-1	-1	1	1	0.11	focus: multi: 1	1	1	Entertaining
Watch	1	-1	0	1	1	1	-1	1	1	0.44	focus: multi: 1	1	0	Hammering
Phone	2	-1	1	0	1	-1	-1	1	1	0.33	focus: multi: 1	1	1	Fixing Things
Total	0.60	-0.40	0.10	-0.30	0.80	-0.60	-0.80	0.90	0.10		12	7		
36														
Sex: 1														
Age: 22														
Profession: Design/Production Art														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	2	1	-2	1	-1	-2	-1	-2	-2	-0.67	focus: multi: 1	0	0	Toasting
Coffee	-1	0	1	-2	1	2	-1	2	-1	0.11	focus: multi: 1	1	1	Broiling
Radio	2	1	-1	2	2	-1	0	2	2	1.00	focus: multi: 0	0	0	Making coffee
TV	2	1	-1	1	2	-1	0	-1	2	0.56	focus: multi: 0	0	0	Making coffee
Hammer	0	1	2	-1	0	-2	0	0	2	0.22	focus: multi: 1	1	0	Serious listening
Screwdriver	-1	1	-1	0	1	-1	-2	-2	-2	-0.78	focus: multi: 1	1	0	Casual listening
Printer	2	1	-1	1	0	-2	-2	2	1	0.22	focus: multi: 1	1	0	Watching (tapes, dvds) part of larger stereo
Knife	2	2	-2	1	2	-1	-1	-1	2	0.44	focus: multi: 1	1	0	Watching tapes, dvds
Watch	2	1	0	1	1	-1	-1	1	1	0.56	focus: multi: 1	1	0	Whacking
Phone	1	-1	-2	-2	1	-2	-2	2	1	-0.44	focus: multi: 1	1	0	Tinkering
Total	1.10	0.80	-0.70	0.20	0.90	-1.10	-1.00	0.30	0.60		13	1		

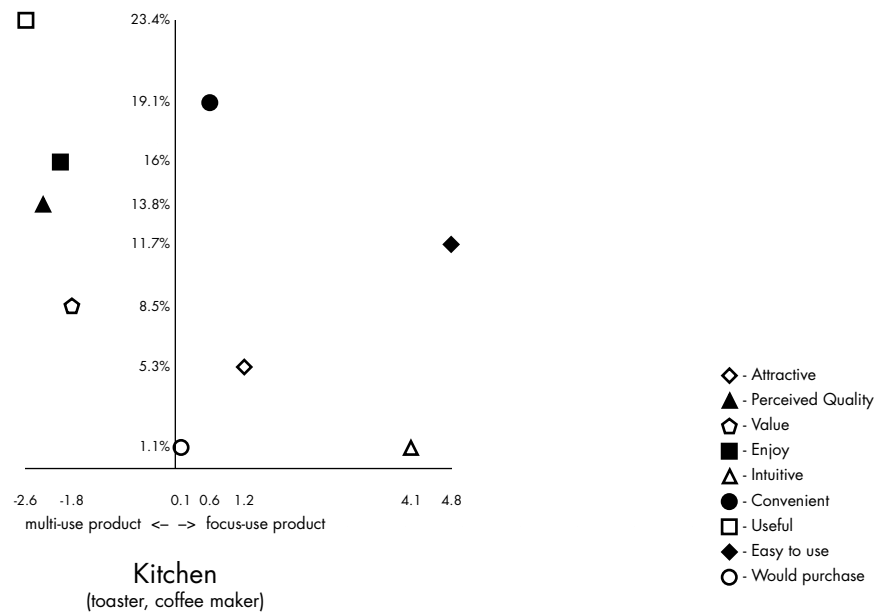
37														
Sex: 1														
Age: 32														
Profession: Artist														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	2	1	1	1	1	1	0	2	2	1.22	focus: multi: 1	1	0	Toast my bread
Coffee	-1	-1	-1	0	0	0	-1	1	0	-0.33	focus: multi: 0	1	1	Burn my toast
Radio	2	2	2	-1	1	1	-1	1	0	0.78	focus: multi: 0	1	1	Wake me up
TV	1	1	0	0	0	-1	-1	1	0	0.11	focus: multi: 0	1	1	Wake me up
Hammer	1	2	2	2	2	2	2	2	2	1.89	focus: multi: 1	1	0	Radio
Screwdriver	1	1	1	1	2	-1	0	1	2	0.89	focus: multi: 1	1	1	Entertainment
Printer	1	0	-1	0	1	0	0	1	1	0.33	focus: multi: 1	1	0	Entertainment
Knife	0	0	0	0	0	0	0	0	0	0.00	focus: multi: 1	1	0	Destroy/Build
Watch	0	0	1	-1	1	-1	-1	1	0	0.00	focus: multi: 1	1	0	Multi-tool for housewife
Phone	-1	-1	1	-1	0	1	-1	0	0	-0.22	focus: multi: 1	1	0	Drive Screws
Total	0.60	0.50	0.60	0.10	0.80	0.20	-0.30	1.00	0.70		focus: multi: 1	1	5	Drive Screws
38														
Sex: 1														
Age: 31														
Profession: Web Developer														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	-1	-1	-1	0	1	-1	-1	1	0	-0.33	focus: multi: 1	1	0	Toasting
Coffee	-1	-1	1	-1	1	0	0	1	1	0.11	focus: multi: 0	1	1	Cooking
Radio	-1	0	0	0	0	0	0	0	-1	-0.22	focus: multi: 0	0	1	Making coffee
TV	0	0	0	0	0	0	0	0	1	0.11	focus: multi: 0	1	1	Making coffee
Hammer	0	0	0	0	0	0	0	0	0	0.00	focus: multi: 1	1	0	Playing music
Screwdriver	0	-1	-1	-1	1	0	-1	1	0	-0.22	focus: multi: 1	1	1	Playing music
Printer	0	-1	-1	0	1	1	-1	1	1	0.11	focus: multi: 1	1	1	Watching
Knife	0	-1	-1	0	0	-1	-1	0	0	-0.44	focus: multi: 1	1	0	Watching
Watch	0	0	0	0	1	-1	-1	1	1	0.11	focus: multi: 1	1	1	Hammering
Phone	-1	0	1	-1	1	0	0	1	1	0.22	focus: multi: 1	1	0	Repairing
Total	-0.40	-0.50	-0.20	-0.30	0.60	-0.20	-0.50	0.60	0.40		focus: multi: 1	1	6	Screwing
39														
Sex: 0														
Age: 31														
Profession: Graphic Design & Web Dev.														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	0	1	1	1	1	1	1	1	0.89	focus: multi: 0	1	0	Toaster
Coffee	-1	1	-1	1	1	1	1	1	1	0.56	focus: multi: 1	1	0	Toaster Oven
Radio	-1	0	0	-1	1	-1	-1	1	0	-0.22	focus: multi: 1	1	0	Coffee Maker
TV	0	1	-1	1	1	1	1	1	1	0.67	focus: multi: 0	0	0	Coffee Capp
Hammer	0	1	1	0	0	0	1	1	1	0.56	focus: multi: 1	1	0	Speaker
Screwdriver	0	0	0	0	0	-1	0	1	0	0.00	focus: multi: 1	1	0	Audio, radio
Printer	1	1	-1	0	1	-1	-1	1	1	0.22	focus: multi: 1	1	0	TV w/DVD
Knife	1	0	0	0	0	-1	0	1	0	0.11	focus: multi: 0	0	0	Nail
Watch	0	0	-1	0	1	1	1	1	1	0.44	focus: multi: 0	0	0	Screw & Nail
Phone	-1	1	-1	0	1	1	1	1	1	0.44	focus: multi: 0	0	0	Screw driver
Total	0.00	0.50	-0.30	0.20	0.70	0.10	0.40	1.00	0.70		focus: multi: 1	1	0	Multi Screwdriver
40														
Sex: 1														
Age: 21														
Profession: Student														
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function	
Toaster	1	1	-1	1	2	0	0	1	0	0.56	focus: multi: 0	1	0	toasting
Coffee	0	0	0	0	1	-1	0	1	0	0.11	focus: multi: 0	0	0	cooking
Radio	1	0	0	0	1	0	0	0	0	0.22	focus: multi: 1	1	1	brewing coffee
TV	0	0	1	-1	0	-1	0	0	0	-0.11	focus: multi: 1	1	1	starbuxing
Hammer	2	1	0	2	0	1	1	1	2	1.11	focus: multi: 1	1	1	listening
Screwdriver	0	2	1	1	0	-1	1	1	1	0.67	focus: multi: 1	1	1	watching
Printer	1	0	0	0	1	-1	0	1	1	0.33	focus: multi: 1	1	1	watching
Knife	2	0	0	0	2	-1	-1	2	1	0.56	focus: multi: 1	1	0	hammering
Watch	1	0	0	0	1	-1	0	1	0	0.22	focus: multi: 0	0	1	hammering
Phone	0	1	0	-1	1	-1	0	1	0	0.11	focus: multi: 1	1	0	screwing
Total	0.80	0.50	0.10	0.20	0.90	-0.60	0.10	0.90	0.50		focus: multi: 1	1	6	screwing

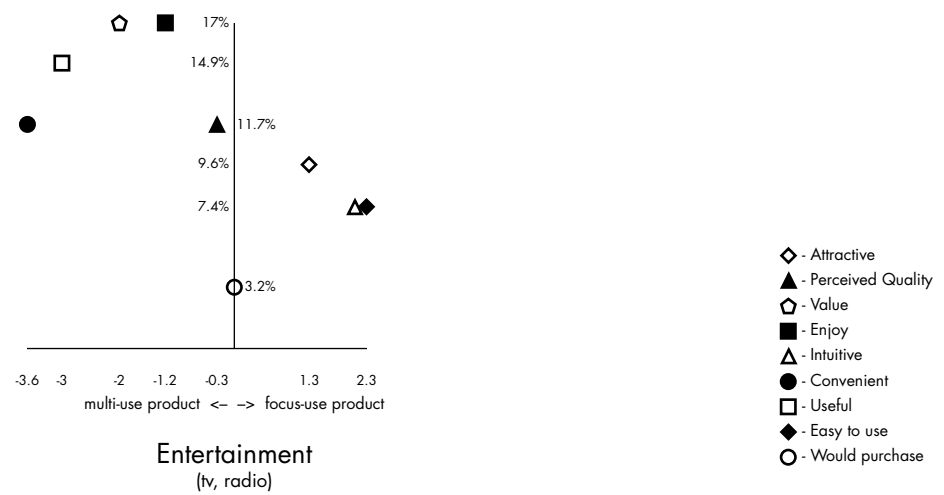
41													
Sex:	1												
Age:	33												
Profession:	Shop Director												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	0	0	0	1	1	-1	1	1	0.44	focus: multi: 1	1	0 Toasting Baking
Coffee	-1	-2	1	0	1	1	0	1	0	0.11	focus: multi: 1	1	0 Making coffee Making coffee type beverages
Radio	0	-1	1	0	1	1	0	1	0	0.33	focus: multi: 0	1	Radio Listening Radio Listening
TV	0	1	-1	1	1	-1	0	1	0	0.22	focus: multi: 1	0	0 TV Viewing VCR/DVD Viewer
Hammer	1	1	-1	1	1	0	1	0	1	0.56	focus: multi: 1	1	0 Drive Nails Multi-purpose tool
Screwdriver	0	0	1	0	1	-1	0	1	0	0.22	focus: multi: 1	1	0 Driving Screws Driving Screws w/multi-head
Printer	0	-1	2	0	1	-1	-1	1	0	0.11	focus: multi: 1	0	0 Printing Print/fax/copy
Knife	0	-1	1	0	1	1	0	1	0	0.33	focus: multi: 1	1	0 Cutting items Multi-purpose tool
Watch	1	0	0	0	1	0	-1	1	0	0.22	focus: multi: 0	1	1 Displaying Time Displaying Time
Phone	-1	-1	1	-1	1	0	0	1	1	0.11	focus: multi: 0	0	0 Cell phone Camera phone
Total	0.10	-0.40	0.50	0.10	1.00	0.10	-0.20	0.90	0.30		14	2	
42													
Sex:	0												
Age:	26												
Profession:	Sales												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	1	-1	-1	0	2	1	0	2	1	0.56	focus: multi: 1	1	0 Toasting Cooking
Coffee	-1	0	-1	0	2	0	0	2	0	0.22	focus: multi: 0	0	0 Coffee maker Espresso machine, coffee maker
Radio	-1	-1	0	0	-2	0	0	-2	-2	-0.89	focus: multi: 0	1	Radio Radio
TV	0	-1	-1	0	0	-1	-1	0	0	-0.44	focus: multi: 1	0	0 Watch TV Watch TV, play movies
Hammer	0	1	0	0	2	-1	0	2	2	0.67	focus: multi: 1	0	0 Hang Picture Travel kit/repairs
Screwdriver	0	0	0	0	1	0	0	1	0	0.22	focus: multi: 0	1	1 Screwdriver Screwdriver
Printer	-1	-2	-2	-2	2	-1	-2	0	0	-0.89	focus: multi: 1	0	0 Printer Fax/Printer
Knife	0	-1	-2	0	0	-2	-2	0	-1	-0.89	focus: multi: 1	1	0 Pocket knife Swiss army knife
Watch	0	-1	-1	-1	2	0	0	2	0	0.11	focus: multi: 1	0	1 Tell time Tell time
Phone	-1	-2	-1	-1	1	0	0	2	-1	-0.33	focus: multi: 0	0	0 Cell phone Cell phone + video
Total	-0.30	-0.80	-0.90	-0.40	1.00	-0.40	-0.50	0.90	-0.10		11	3	
43													
Sex:	1												
Age:	24												
Profession:	Web Design												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	2	-1	-2	0	0	0	0	2	2	0.33	focus: multi: 0	1	1 Toasting Toasting
Coffee	-2	0	0	0	0	-1	0	0	0	-0.33	focus: multi: 0	1	0 Coffee Maker Coffee Maker
Radio	0	0	0	0	1	1	-1	0	0	0.11	focus: multi: 0	0	0 Speaker Personal Speaker
TV	2	1	-1	1	0	0	0	0	1	0.44	focus: multi: 1	1	1 Watching Watching
Hammer	0	0	0	0	0	0	0	0	0	0.00	focus: multi: 1	1	0 Hammering Hammering + screwing
Screwdriver	-1	-1	-1	-2	0	-2	-2	-2	-2	-1.44	focus: multi: 1	1	0 Screwdrivers Auto Screwdrivers
Printer	-2	-2	1	-1	-2	-2	-2	-1	-2	-1.44	focus: multi: 0	1	0 To Print All in one printer
Knife	-1	0	0	-1	-1	-1	-2	-1	-2	-1.00	focus: multi: 0	0	0 Pocket Knife All in one pocket knife
Watch	0	-1	1	-1	-1	-1	-1	0	-1	-0.56	focus: multi: 1	1	0 Watch Calculator watch
Phone	-2	-2	1	-2	-2	-2	-2	-2	-2	-1.67	focus: multi: 1	1	1 Cell phone Cell phone
Total	-0.40	-0.60	-0.10	-0.60	-0.50	-0.80	-1.00	-0.40	-0.60		11	4	
44													
Sex:	0												
Age:	26												
Profession:	Account Management												
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	0	0	-1	0	-1	0	-1	0	0	-0.33	focus: multi: 0	1	1 Toasting Toasting
Coffee	0	0	0	-1	1	0	0	-1	-1	-0.22	focus: multi: 1	1	0 Coffee Coffee + Espresso
Radio	0	0	-1	1	-1	0	0	0	-1	-0.22	focus: multi: 0	0	0 Speaker Sound Recorder
TV	0	0	1	1	-1	-1	0	-1	0	-0.11	focus: multi: 1	1	0 TV VCR/DVD
Hammer	0	0	0	2	2	0	0	0	0	0.44	focus: multi: 1	0	0 Hammering nails Hammering/Screwing
Screwdriver	2	1	1	2	1	1	1	1	1	1.22	focus: multi: 0	1	1 Screwing Screwing
Printer	1	0	0	1	1	0	0	-1	0	0.22	focus: multi: 0	0	0 Copy Copy/Fax/Scan
Knife	1	1	0	0	0	1	0	0	-1	0.22	focus: multi: 0	0	0 Knife ?!
Watch	2	1	1	1	1	1	1	1	2	1.22	focus: multi: 0	0	0 Watch Calculator
Phone	0	0	1	0	1	-1	-1	0	-1	-0.11	focus: multi: 1	0	0 Phone Phone/TV
Total	0.60	0.30	0.20	0.70	0.40	0.10	0.00	-0.10	-0.10		8	2	

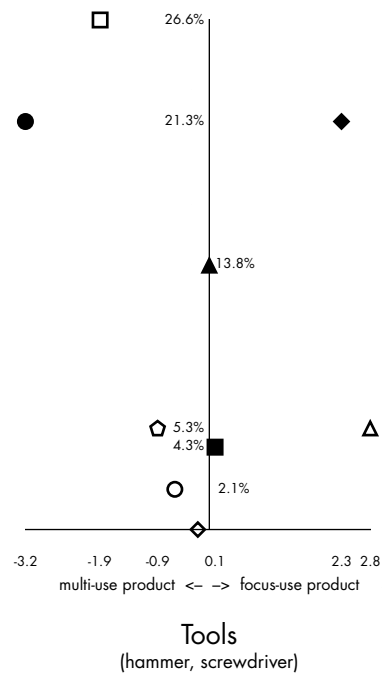
45													
Sex: 0													
Age: 24													
Profession: Account Mgr.													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	-1	-1	1	0	1	0	0	2	0	0.22	focus: multi: 1	0	Toasting Baking
Coffee	-2	-1	-1	0	1	1	1	1	-2	-0.22	focus: multi: 1	0	Coffee Coffee & Cappuccino
Radio	-2	-1	1	-1	1	-1	0	1	-1	-0.33	focus: multi: 1	0	Speaker ?
TV	-1	-1	-2	-1	1	1	-1	1	-2	-0.56	focus: multi: 1	0	Basic multi-functional
Hammer	-1	-1	1	0	1	0	0	2	0	0.22	focus: multi: 1	0	Hammering Multi-repair
Screwdriver	-2	-1	-2	0	1	-2	-2	-1	-2	-1.22	focus: multi: 1	0	Screwing Multi-functional screws
Printer	-1	-1	0	-1	1	1	0	1	-1	-0.11	focus: multi: 1	0	Printing Scanning & Printing
Knife	-1	-1	0	0	1	-1	-2	2	0	-0.22	focus: multi: 0	0	Cutting Multi-function tool kit
Watch	1	-1	0	1	2	2	2	2	1	1.11	focus: multi: 1	0	Telling time Scheduler
Phone	-2	-1	2	-1	1	1	0	1	-1	0.00	focus: multi: 1	0	Calls, Cell phone Pictures, Camera phone
Total	-1.20	-1.00	0.00	-0.30	1.10	0.20	-0.20	1.20	-0.80		11	0	
46													
Sex: 1													
Age: 27													
Profession: Sales													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	2	0	1	0	2	-1	-1	2	0	0.56	focus: multi: 1	1	Toasting Toasting
Coffee	-1	-1	0	-1	1	-1	-1	1	1	-0.22	focus: multi: 0	0	Making coffee Coffee & Cappuccino
Radio	-1	-1	0	-1	1	-1	-1	1	-1	-0.44	focus: multi: 1	0	Speaker Radio
TV	1	0	1	-1	1	-1	-1	1	1	0.22	focus: multi: 1	0	TV & Movies Watching TV
Hammer	-1	0	1	-1	0	0	0	1	0	0.00	focus: multi: 1	0	Nailing Working
Screwdriver	0	-1	1	0	1	-1	-1	1	-1	-0.11	focus: multi: 1	1	Screwing Screwing
Printer	-1	-1	1	0	1	-1	-1	0	0	-0.22	focus: multi: 1	0	Printing Faxing
Knife	0	-1	-1	-1	1	-1	-2	1	-1	-0.56	focus: multi: 1	0	Cutting Working
Watch	1	0	1	0	1	1	-1	1	1	0.56	focus: multi: 1	1	Telling time Telling time
Phone	-1	-1	0	-1	1	-1	-1	1	1	-0.22	focus: multi: 1	0	Calling Calling
Total	-0.10	-0.60	0.50	-0.60	1.00	-0.70	-1.00	1.00	0.10		13	4	
47													
Sex: 0													
Age: 27													
Profession: Project Manager, Clinical Research													
	Attractive	Perceived Quality	Value	Enjoy	Intuitive	Convenient	Useful	Easy to use	Would purchase	Total	Own	Same Func	Function
Toaster	0	-1	-1	-1	-1	-2	-2	-1	-1	-1.11	focus: multi: 1	0	Toasts bread Heats food
Coffee	-1	-1	-1	-1	-1	-1	-1	2	0	-0.56	focus: multi: 0	0	Makes coffee Makes coffee/cappuccino/etc
Radio	0	0	0	0	-1	-1	-1	-1	0	-0.44	focus: multi: 1	0	Plays music Plays music/Alarm clock
TV	-1	-1	-1	-1	-2	-2	-2	-1	-1	-1.33	focus: multi: 1	0	Watch TV Watch TV, review stuff
Hammer	0	0	-1	-1	0	-1	-1	0	-1	-0.56	focus: multi: 1	0	Hammers nails Helps one build stuff
Screwdriver	-2	-1	0	-2	-2	-2	-2	-2	-2	-1.67	focus: multi: 1	1	Screws in nails Screws in nails
Printer	-1	-1	-1	-1	-2	-2	-1	-1	-1	-1.22	focus: multi: 1	0	Printer Printer/scanner/fax/copier
Knife	-1	-1	-1	-1	-1	-2	-2	0	-1	-1.11	focus: multi: 0	0	Cuts stuff Cuts lots of stuff
Watch	0	0	0	1	-1	-1	-1	1	1	0.00	focus: multi: 1	0	Tells time Time/Calculator/Alarm
Phone	-2	-1	-1	-1	-2	-2	-2	-1	-1	-1.44	focus: multi: 1	0	Send/receive calls camera/phone
Total	-0.80	-0.70	-0.70	-0.80	-1.30	-1.60	-1.50	-0.40	-0.70		15	1	

Appendix C: All created graphs

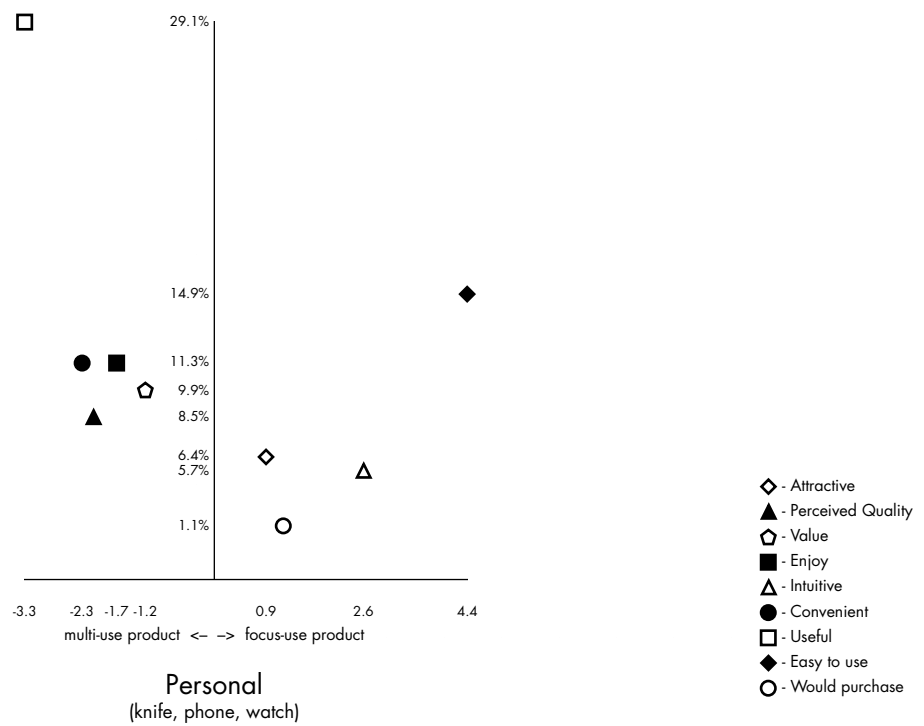


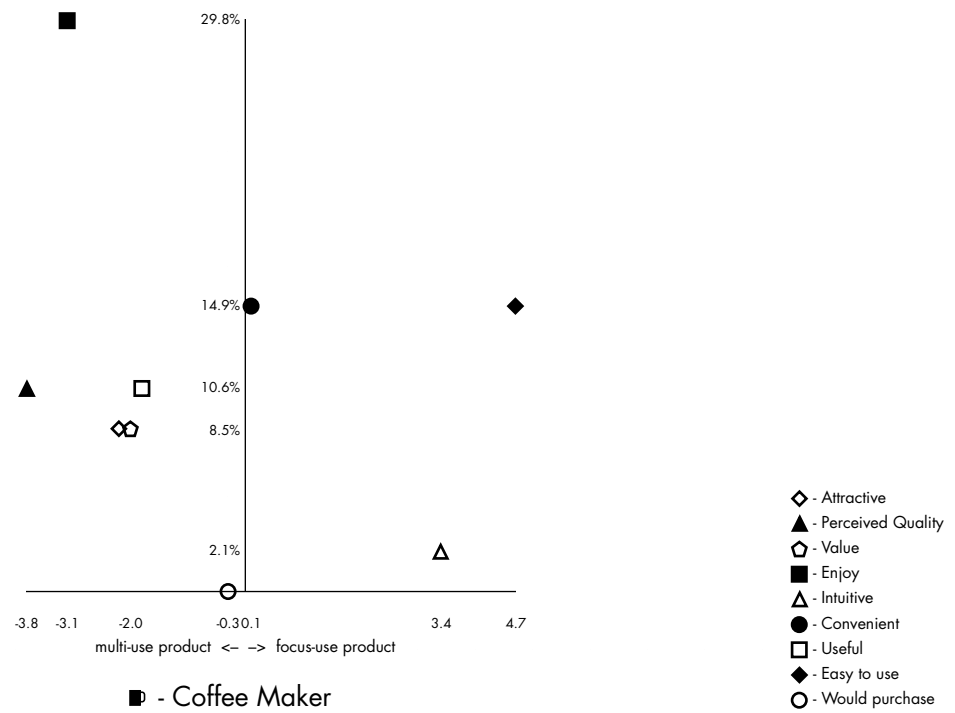


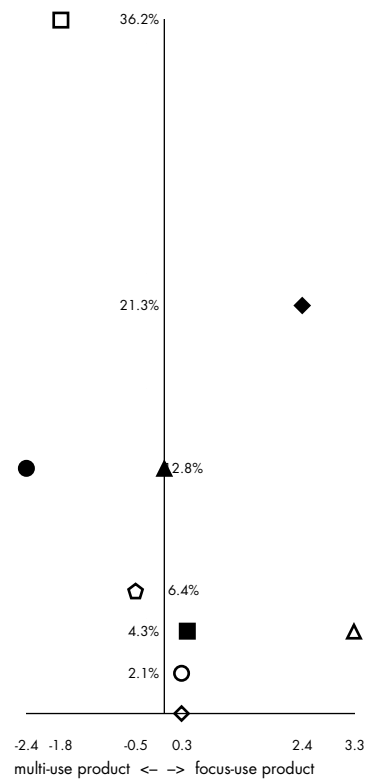




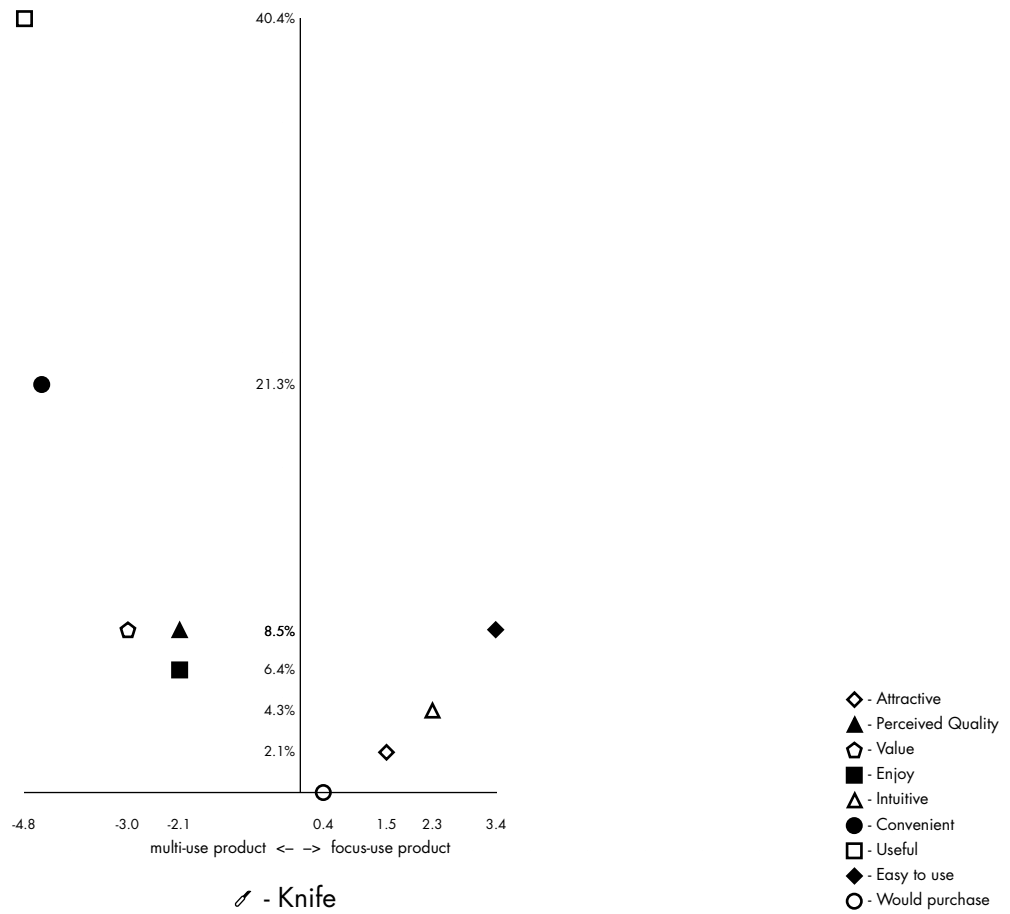
- ◇ - Attractive
- ▲ - Perceived Quality
- ⬠ - Value
- - Enjoy
- △ - Intuitive
- - Convenient
- - Useful
- ◆ - Easy to use
- - Would purchase

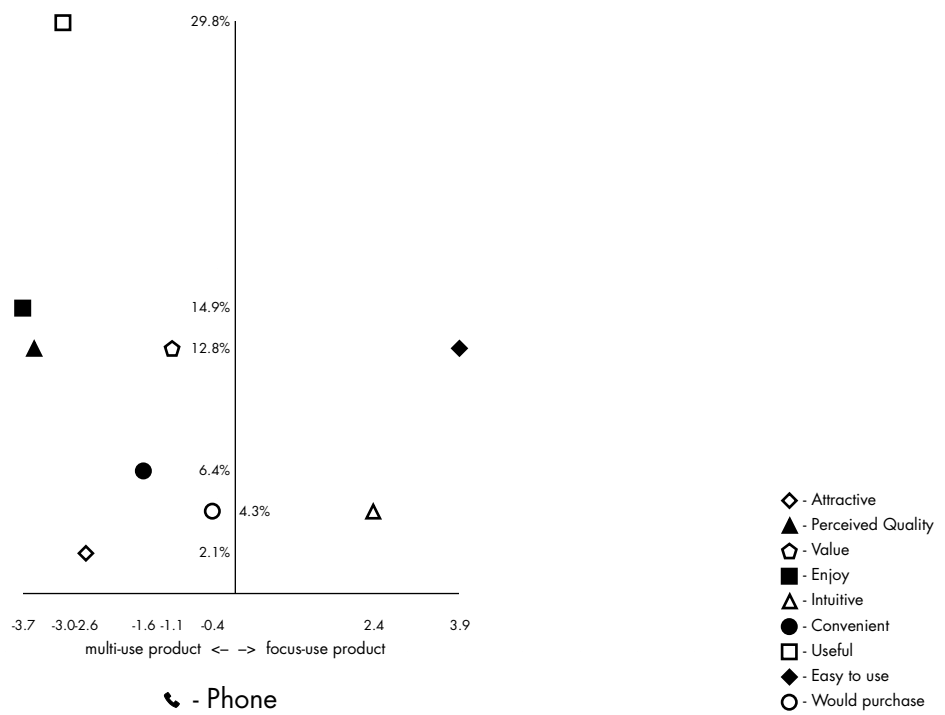


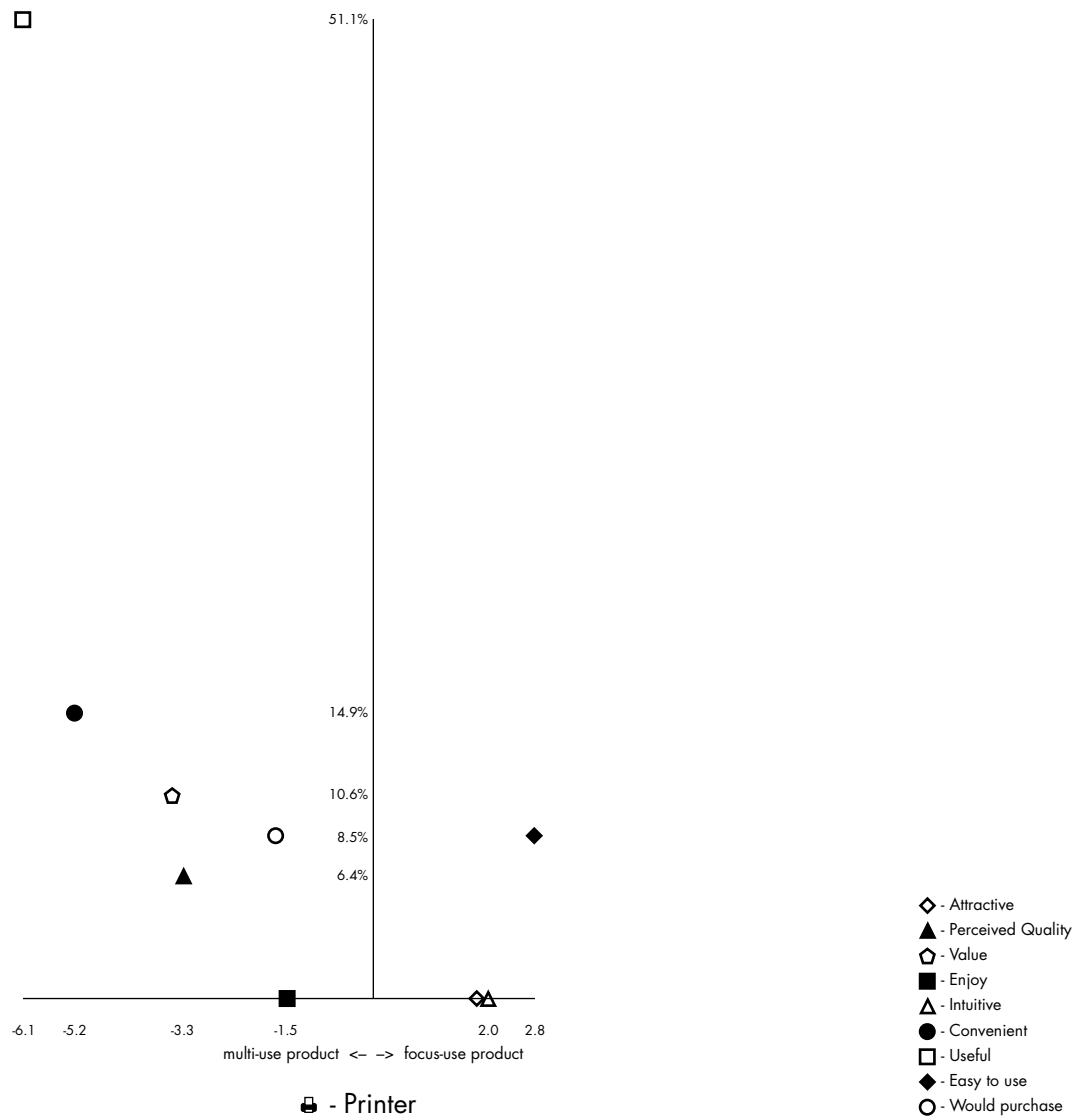


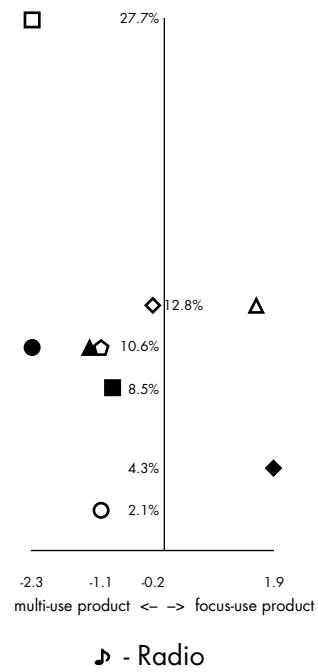


- ◇ - Attractive
- ▲ - Perceived Quality
- ⬠ - Value
- - Enjoy
- △ - Intuitive
- - Convenient
- - Useful
- ◆ - Easy to use
- - Would purchase

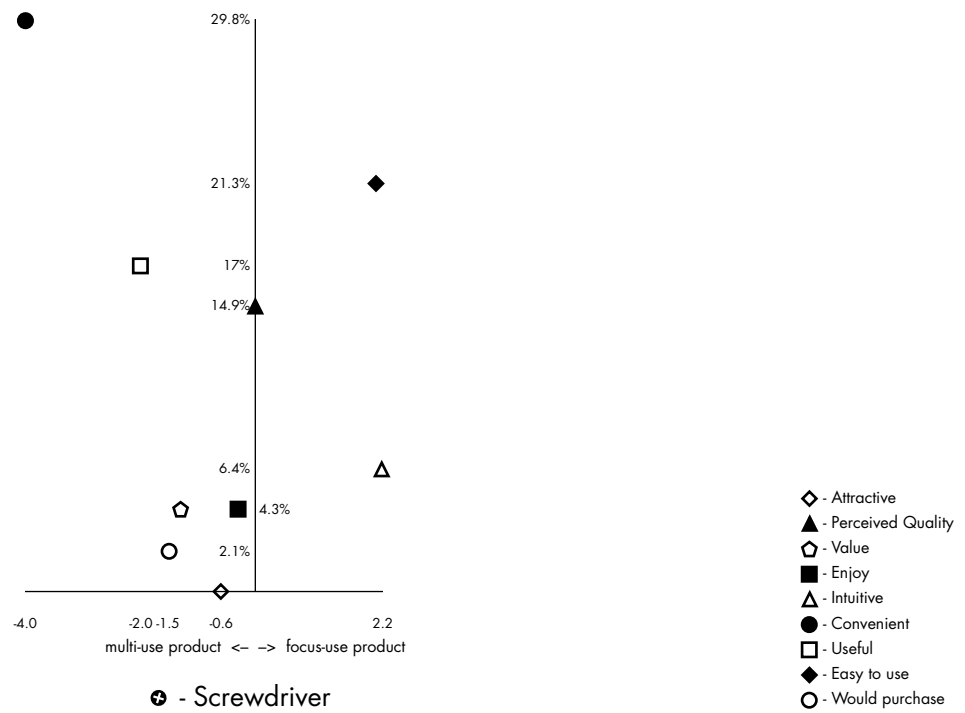


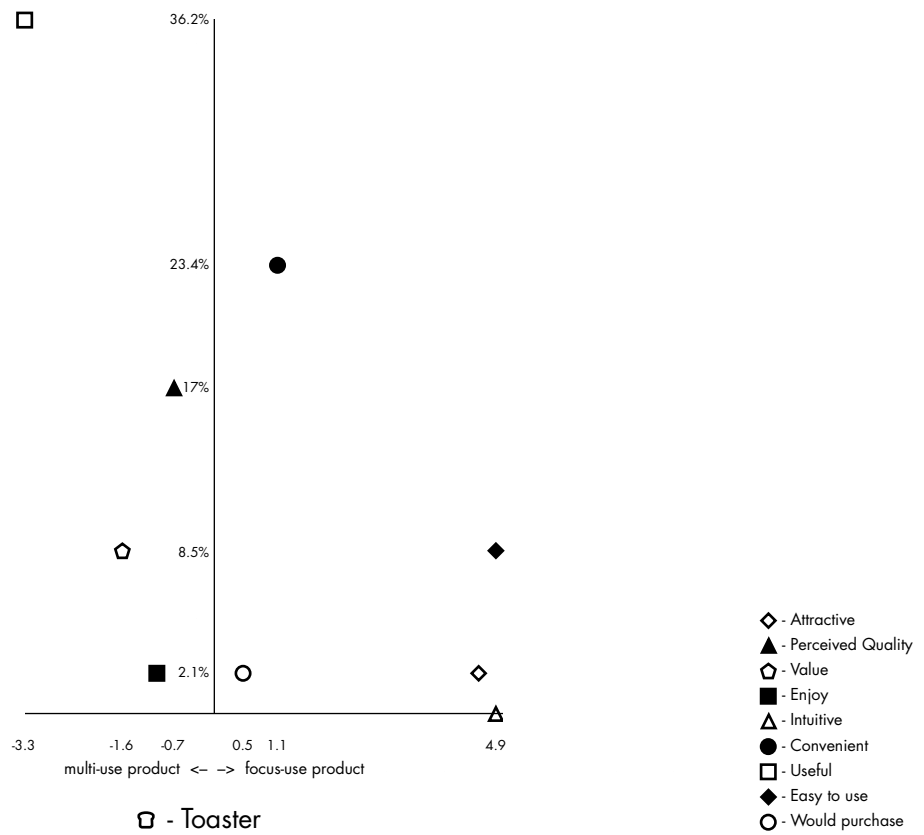


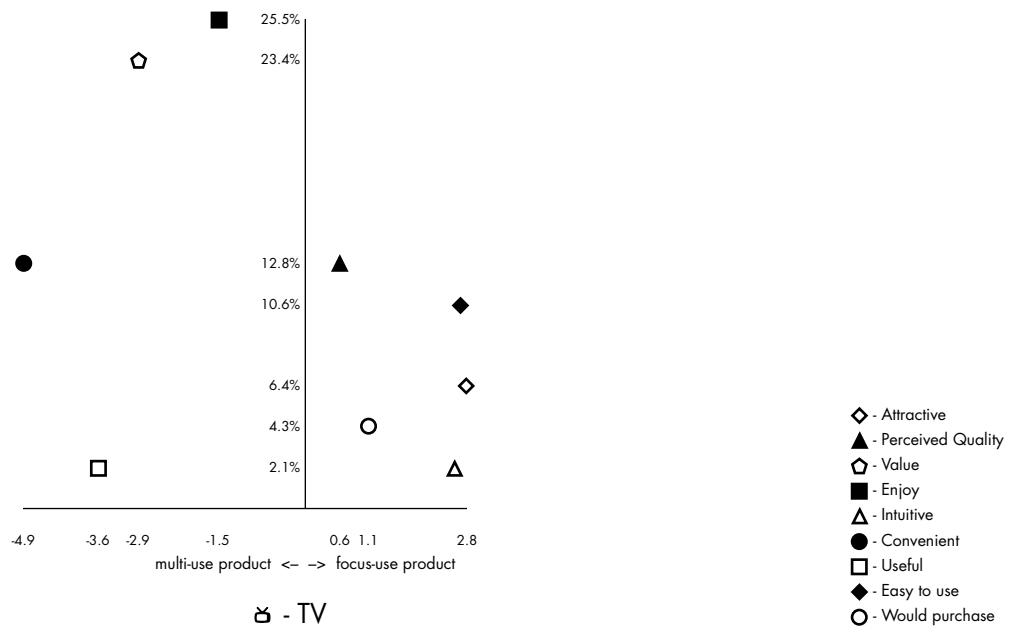


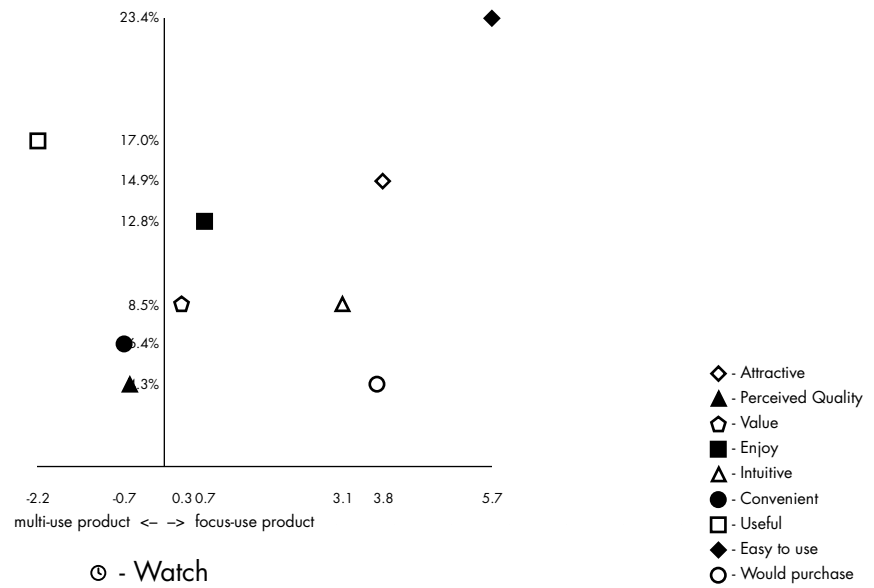


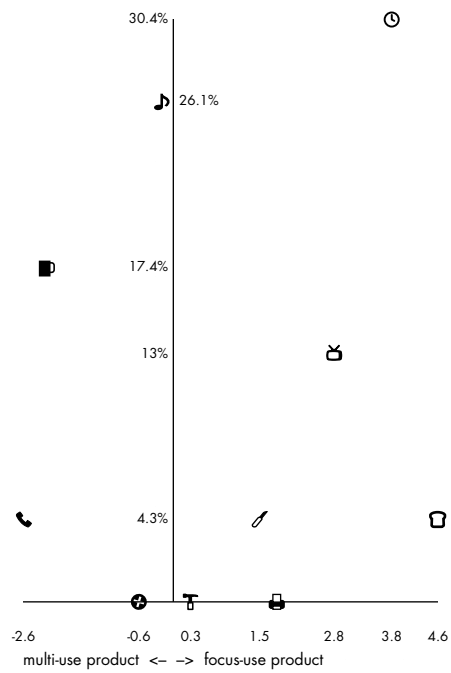
- ◇ - Attractive
- ▲ - Perceived Quality
- ◻ - Value
- - Enjoy
- △ - Intuitive
- - Convenient
- - Useful
- ◆ - Easy to use
- - Would purchase





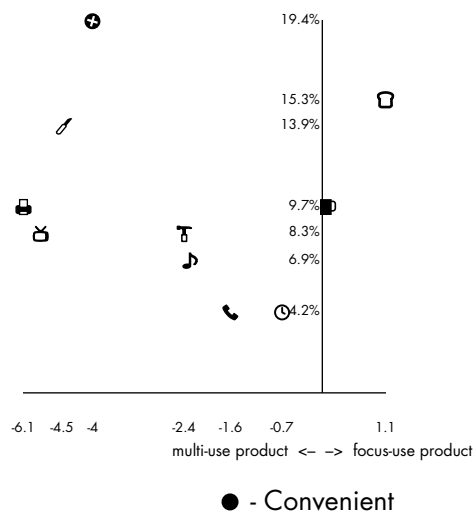




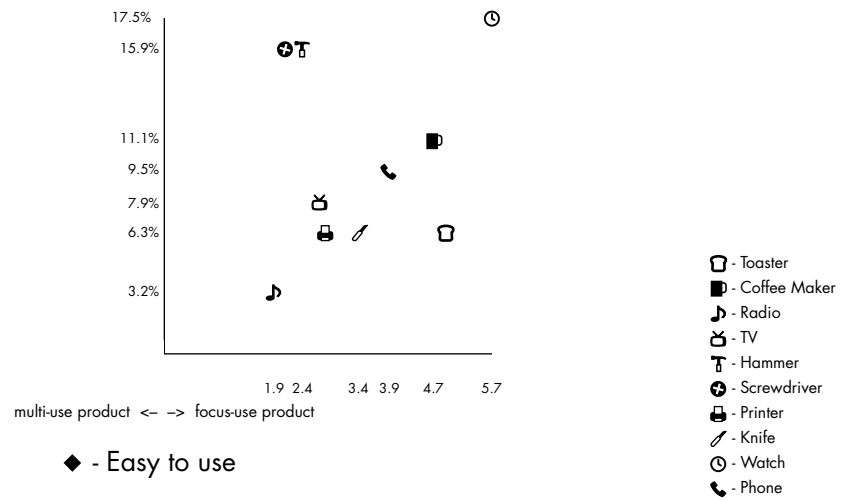


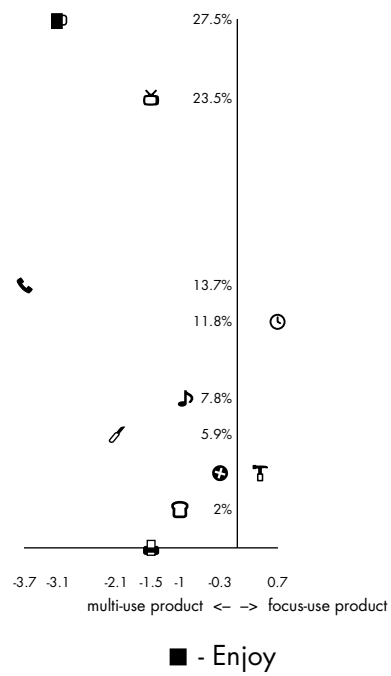
◇ - Attractive

- ☐ - Toaster
- ☐ - Coffee Maker
- 🎵 - Radio
- 📺 - TV
- 🔨 - Hammer
- 🔩 - Screwdriver
- 🖨 - Printer
- 🔪 - Knife
- 🕒 - Watch
- 📞 - Phone

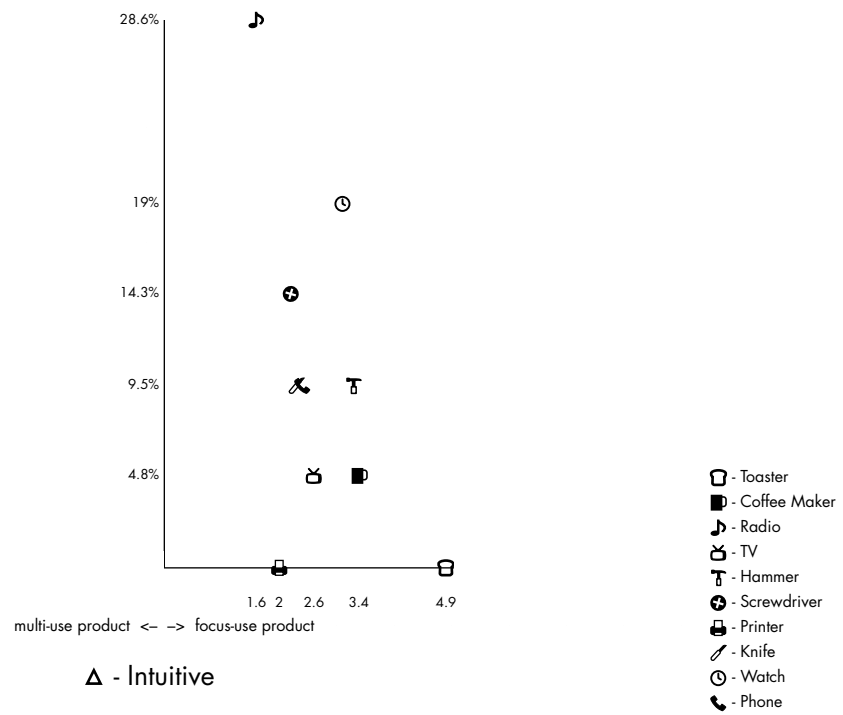


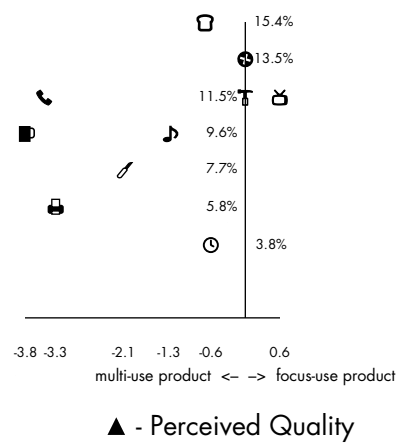
- ☐ - Toaster
- ☑ - Coffee Maker
- 🎵 - Radio
- 📺 - TV
- 🔨 - Hammer
- ⚙️ - Screwdriver
- 🖨️ - Printer
- 🔪 - Knife
- 🕒 - Watch
- 📞 - Phone



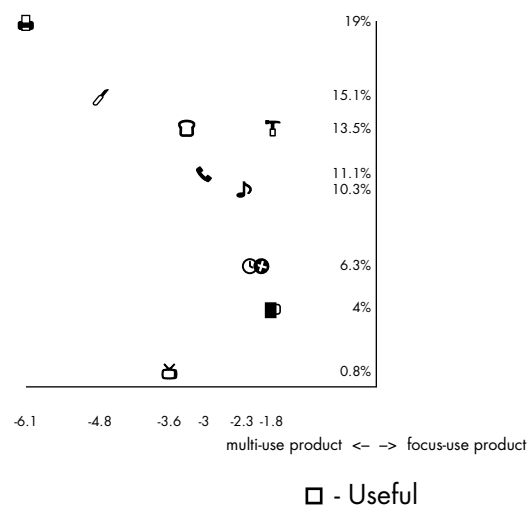


- ☐ - Toaster
- ☐ - Coffee Maker
- 🎵 - Radio
- 📺 - TV
- 🔨 - Hammer
- 🔩 - Screwdriver
- 🖨 - Printer
- 🔪 - Knife
- 🕒 - Watch
- 📞 - Phone

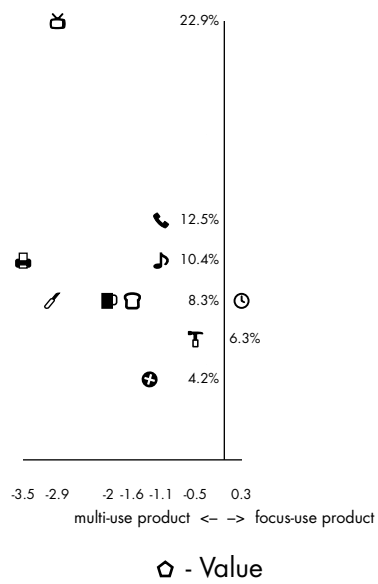




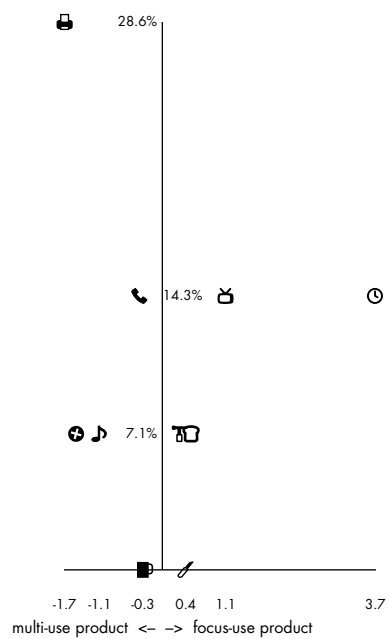
- ☐ - Toaster
- ☑ - Coffee Maker
- 🎵 - Radio
- 📺 - TV
- 🔨 - Hammer
- 🔩 - Screwdriver
- 🖨 - Printer
- 🔪 - Knife
- 🕒 - Watch
- 📞 - Phone



- ☐ - Toaster
- ☐ - Coffee Maker
- 🎵 - Radio
- 📺 - TV
- 🔨 - Hammer
- 🔩 - Screwdriver
- 🖨️ - Printer
- 🔪 - Knife
- 🕒 - Watch
- 📞 - Phone

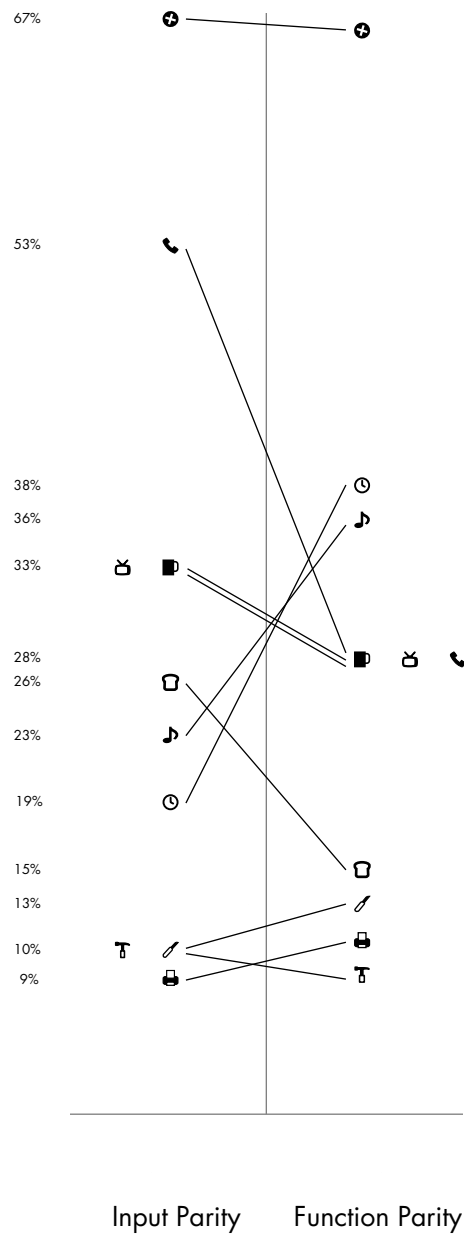


- Toaster
- Coffee Maker
- Radio
- TV
- Hammer
- Screwdriver
- Printer
- Knife
- Watch
- Phone

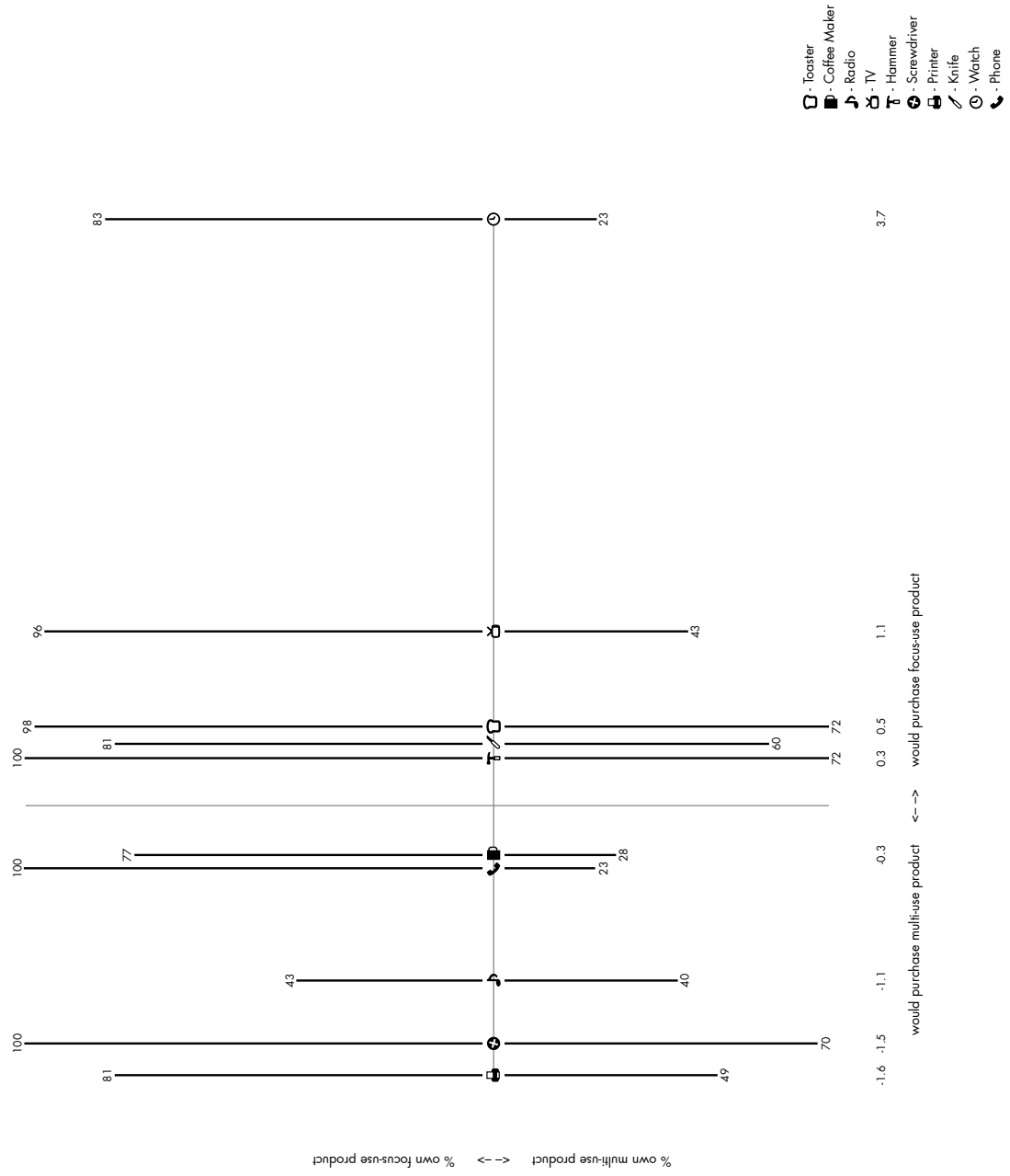


○ - Would purchase

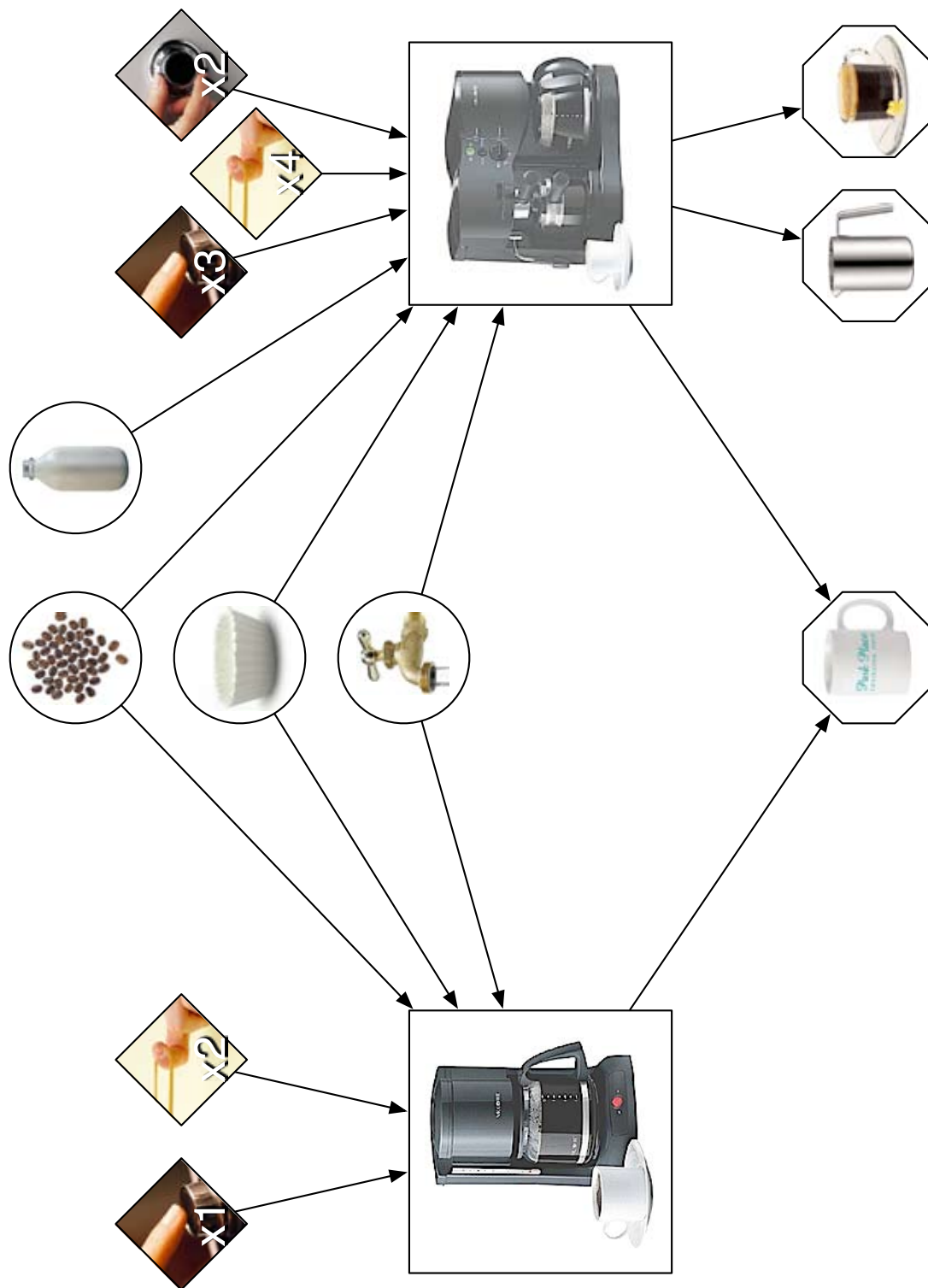
- ☐ - Toaster
- - Coffee Maker
- ♪ - Radio
- 📺 - TV
- 🔨 - Hammer
- ⚙️ - Screwdriver
- 🖨️ - Printer
- 🔪 - Knife
- 🕒 - Watch
- 📞 - Phone

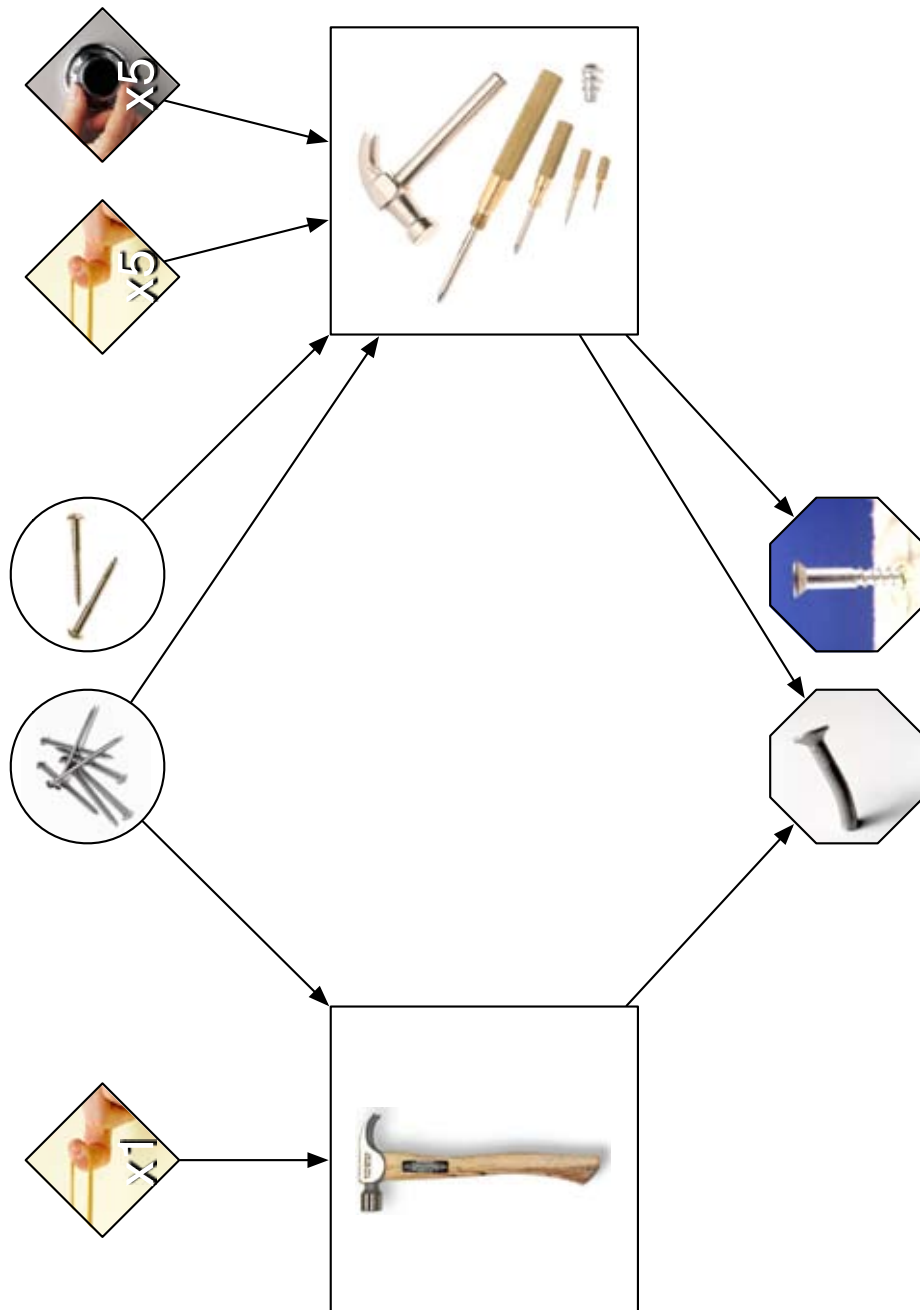


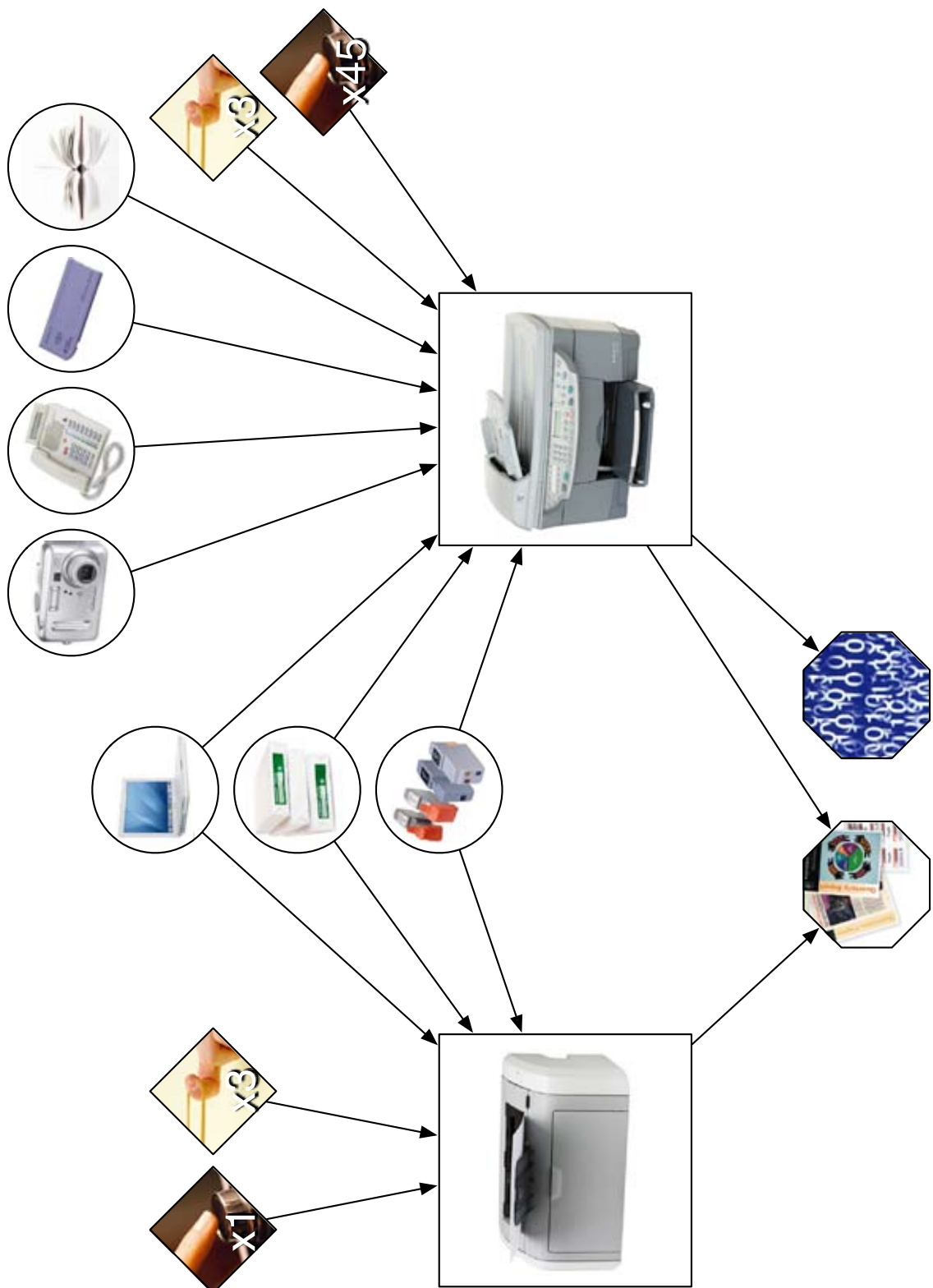
- Toaster
- Coffee Maker
- Radio
- TV
- Hammer
- Screwdriver
- Printer
- Knife
- Watch
- Phone

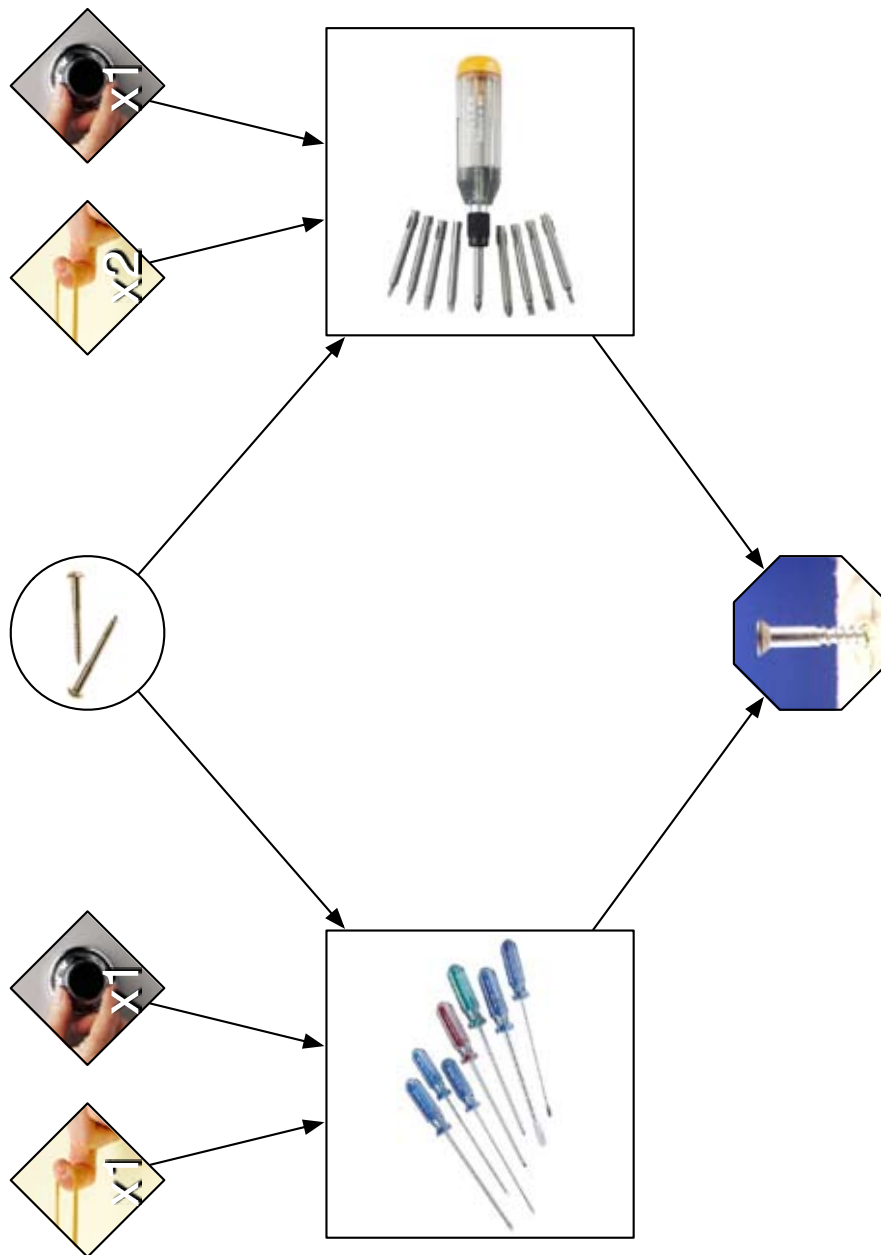


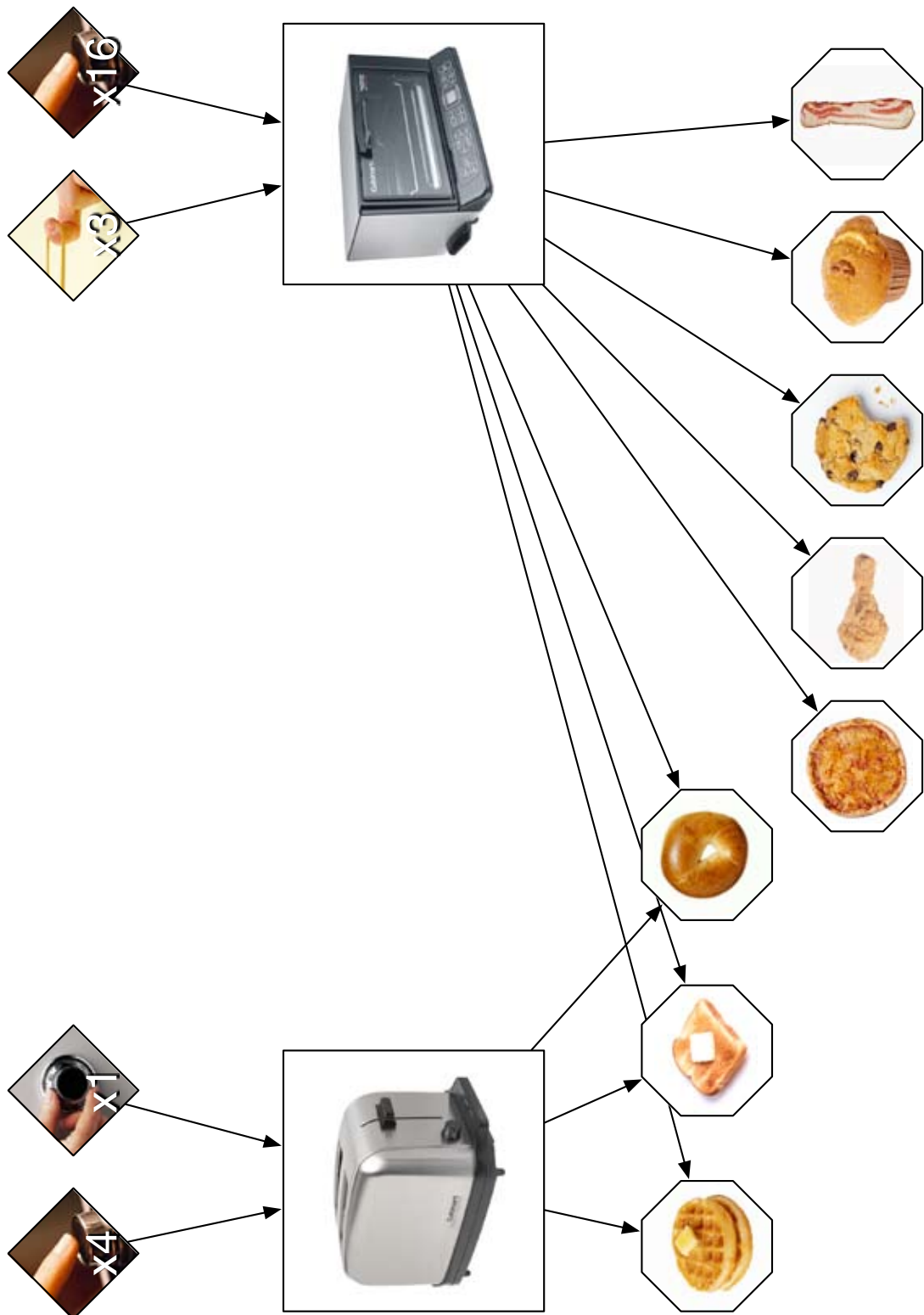
Appendix D: Input/output maps

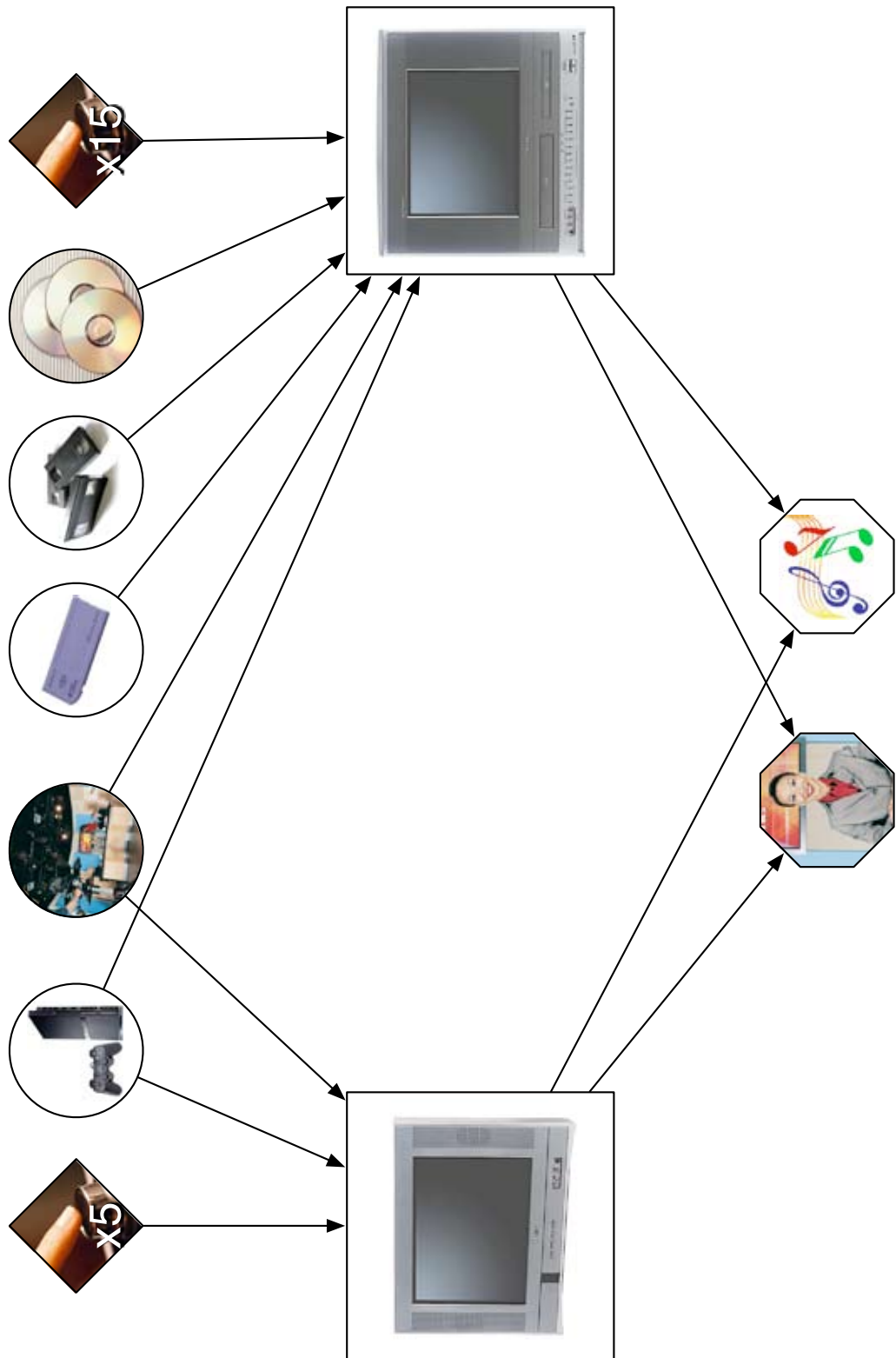












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